



474096

# Portage Creek Sediment Remediation Project Kalamazoo, Michigan

Pre-Sediment Removal Structure Feature Assessment  
Removal Areas SA1-A, SA1-B and SA1-C



Prepared For:



**Environmental Quality Management, Inc.**

Prepared By:



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ENGINEERING, INC.**

F&V Project Number: 809930  
May, 2013 (Updated June, 2013)







#### General Notes:

- The following list of structures was generated based on a field review of the removal area supplemented with a review of available construction records. It may not be an exhaustive list of constructed features in the removal area. Additionally, field review was completed during a time of abnormally high and turbid water conditions, which may have obscured structures near or below the normal water line. If additional constructed features are encountered during sediment removal operations, F&V should be notified of the discovery to allow for review of their potential impact on the project.
- Pre-Sediment Removal review was focused on the channel and bank areas, including structures potentially impacted directly by the removal of sediment. There are other structures in the general project area which should be avoided or protected from damage from construction equipment during removal and transportation of sediment.
- As is the case when undertaking any underground work, Miss Dig should be contacted to locate active utilities in the project area prior to commencing with removal operations.



Designation: SA1-A-S01

Location: SA1-A-S01 is located approximately 5' from the west bank of Portage Creek at the south end of SA1-A.

Description: SA1-A-S01 is a wood utility pole carrying several overhead utilities.

Pre-existing Condition:

- A large tree recently fell along the west bank of Portage Creek. The guy wire for the pole appears to be tangled with the tree, which is now located across the creek.
- The pole itself is severely weathered and has splitting throughout its length.

Protective Measures:

- The utility company should be notified of the impacted guy wire, so that repairs can be made to stabilize the pole prior to sediment removal operations.
- Sediment should not be removed within the 1:1 influence area of the pole or guy anchor unless the pole is supported during the work.
- Construction fencing or similar means should be used to identify the pole and guy to operators and drivers during the work.





Pole viewed from the channel



Weathering and splitting on the pole above grade



Structure: SA1-A-S01

Date: May 1, 2013



View of the pole and tangle guy looking east



Designation: SA1-A-S02

Location: SA1-A-S02 is located in the southwest quadrant of the Michigan Avenue Bridge over Portage Creek. It is located approximately 15' from the top of bank.

Description: SA1-A-S02 is a CMU/brick building.

Pre-existing Condition:

- The CMU has moderate vertical and step cracking.
- A severe vertical crack was noted at the joint between sections of the building.

Protective Measures:

- The building appears to be outside the influence of the sediment removal. Operators and drivers should use due care when working around the building to avoid damage from equipment.





View of the south portion of the structure from the channel



View of the north portion of the structure from the channel



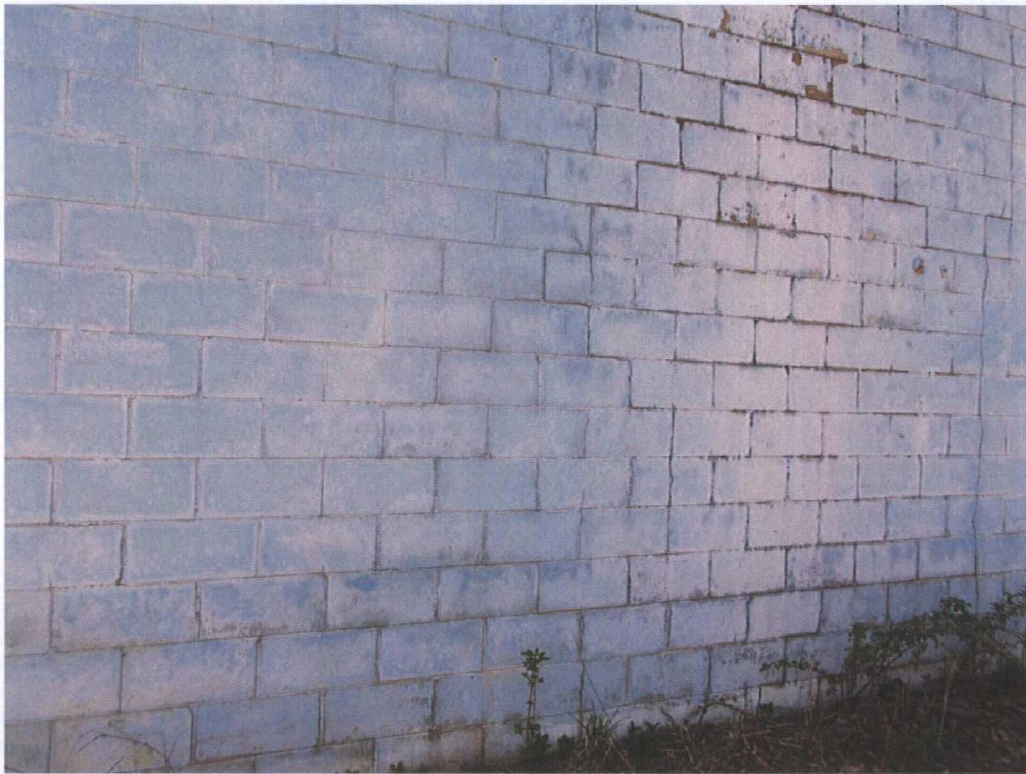


View of the southeast corner of the structure looking north



Steel reinforcing angle on the southeast corner of the building





Step cracking in CMU



Gravel access road along the east side of the building





Vertical cracking in the CMU



Severe vertical crack at joint between building sections



Designation: SA1-A-S03

Location: SA1-A-S03 is located in the southwest quadrant of the Michigan Avenue Bridge over Portage Creek. It is located approximately 12' from the top of bank.

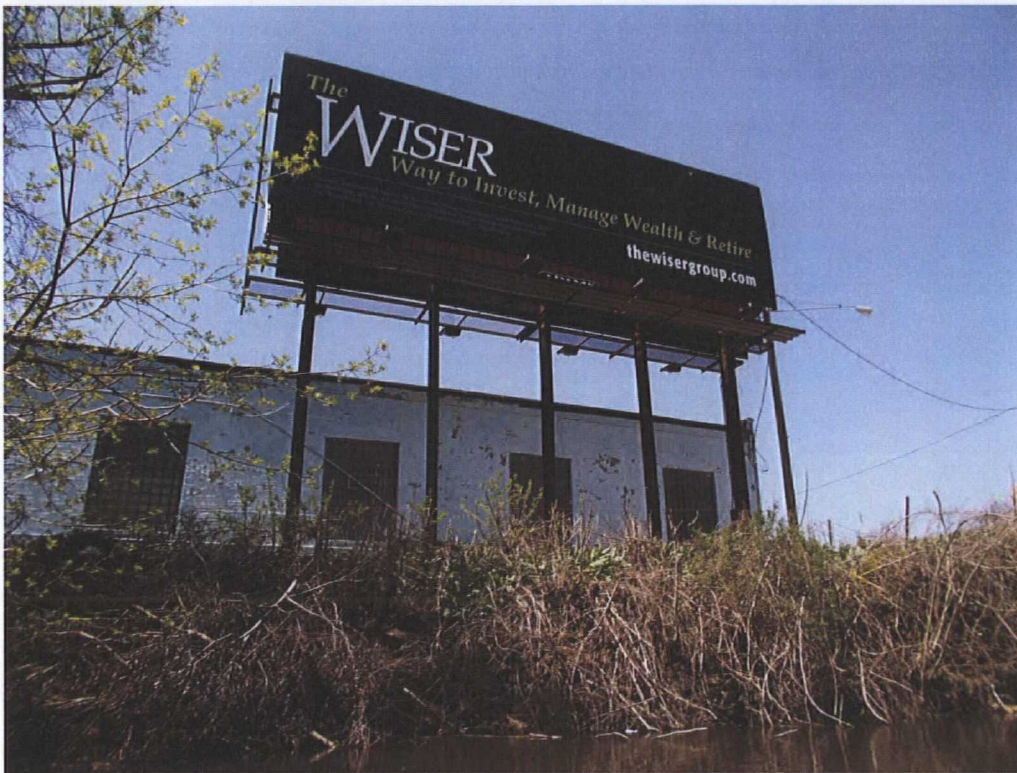
Description: SA1-A-S03 is a billboard structure consisting of steel H-pile columns supporting the access and billboard areas above. There is an electric service panel for the structure mounted on the northernmost column.

Pre-existing Condition:

- The steel columns appear to be in fair to good condition, with paint mostly intact. The columns extend below grade to a suspected deep foundation.
- The billboard itself and other ancillary portions of the structure appear to be in good condition as well.

Protective Measures:

- Because it is suspected that the structure is supported on a deep foundation, it is likely outside the influence of the sediment removal.
- Construction fencing or similar means should be used to identify the columns to operators and drivers during the work.



View of the structure from the channel



Electric service panel mounted to northernmost column



Structure: SA1-A-S03

Date: May 1, 2013



View of the structure looking north

Designation: SA1-A-S04

Location: SA1-A-S04 is located approximately 100' south of the Michigan Avenue Bridge on the east bank of Portage Creek.

Description: SA1-A-S04 is a steel outlet pipe of unknown purpose.

Pre-existing Condition:

- The pipe is severely deteriorated. The end of the pipe has complete section loss around much of its circumference and there is a large hole in the north side 2' from the end.

Protective Measures:

- It is likely that the pipe can be removed or cut off at grade and abandoned if it conflicts with sediment removal operations.





View of the structure from the channel



View of the structure looking south, showing large hole in north side

Designation: SA1-A-S05

Location: SA1-A-S05 is located on the west bank of Portage Creek in the southwest quadrant of the Michigan Avenue Bridge.

Description: SA1-A-S05 is concrete rubble wall extending south from the bridge substructure.

Pre-existing Condition:

- The wall is overgrown with brush.
- A number of dislocated blocks were noted.

Protective Measures:

- Sheet pile cofferdams should be located a minimum of 3-4 feet from the toe of the structure. Sand bag cofferdams could be placed closer to the structure.





View of structure from the channel



View of the structure from the channel

Designation: SA1-A-S06

Location: SA1-A-S06 is located on the east bank of Portage Creek in the southeast quadrant of the Michigan Avenue Bridge.

Description: SA1-A-S06 is concrete rubble wall extending south from the bridge substructure.

Pre-existing Condition:

- The wall is overgrown with brush.
- A number of dislocated blocks were noted.

Protective Measures:

- Sheet pile cofferdams should be located a minimum of 3-4 feet from the toe of the structure. Sand bag cofferdams could be placed closer to the structure.





View of structure from the channel



View of the structure from the channel





View of structure from the channel



Designation: SA1-A-S07

Location: SA1-A-S07 is the Michigan Avenue Bridge over Portage Creek.

Description: SA1-A-S07 is a single span steel girder structure on concrete abutments. It has a concrete deck and sidewalks and steel tube railings. It was constructed in 1946 and the deck was replaced in 1995 along with partial beam replacement and other improvements. According to the available construction plans, the abutments are supported on spread footings.

Pre-existing Condition:

- The channel spans from abutment to abutment. There is no bank intact at the structure.
- The corners of the abutments have cracking with efflorescence and spalling.
- Based on the elevations in the plans and field measurements of the channel, the bottom of footing is approximately 7 feet below bottom of channel and bottom of subfooting is approximately 10 feet below bottom of channel.
- The steel beams appear to be in fair to good condition, with the paint mostly intact. Minor corrosion was noted at the bearing area and scattered elsewhere.
- Moderate slope/bank erosion was noted in all 4 quadrants, severe in the northwest.
- The abutments have minor to moderate vertical cracking scattered throughout. There is an isolated spall to steel beneath beam 4S on in the southwest. The top of abutment is cracked and delaminated between beams 1S and 5S in the southwest.
- The deck soffit has scattered hairline longitudinal cracking with efflorescence.
- Scattered riprap was detected along the abutments below the waterline.
- The structure supports utility crossings beneath bay 1N, 6N and 6S. According to the City of Kalamazoo's mapping, one of the the water mains on the bridge structure has been abandoned.
- There is a 12" concrete outlet in the southeast quadrant. The end of the pipe has severe cracking and spalling. Based on the City of Kalamazoo's mapping, there are outlets in all 4 quadrants, however, not all were located.
- Scattered woody debris was noted in the channel.
- The concrete approaches have severe transverse cracking.
- ASR-type cracking was noted in the railing end walls.
- Hairline map cracking was noted in the sidewalk beneath the railings. The sidewalks have scattered hairline to minor map cracking.
- There is an area of severe curb/sidewalk spalling in the southwest.
- The deck has an isolated area of spalling, approximately 12"x18" along the west reference line near centerline.
- There is a failed cable railing in the southwest.
- The decorative street light in the northwest quadrant has sustained damage to its base.
- The asphalt pavement beyond the concrete approaches is severely deteriorated with significant cracking and spalling/cold patch.
- Heavy brush growth was noted in all four quadrants.
- There is a service panel for the park in the northeast quadrant.

- Based on mapping from Consumers Energy, there appears to be an underground 4" gas main south of the structure and underground electric to the east and west of the structure.
- Based on mapping from the City of Kalamazoo, there appears to be a 16" water main crossing on the north side of the bridge as well as an underground sanitary force main just north of the bridge.

Protective Measures:

- The 12" storm sewer outlet in the southeast should be isolated with a cofferdam during sediment removal. A minimum clearance of 2-3' is recommended for the cofferdam. Other outlets encountered should be protected similarly.
- Because the bridge is supported on spread footings, which are more susceptible to vibration and settlement than structures on deep foundations, a minimum clearance of 6-8' is recommended for sheet pile cofferdams near the structure.
- Utilize Miss Dig Flagging to confirm the location of gas, electric, force main and water main in the area of the structure prior to installing any cofferdam structures. Maintain a minimum of 4-6 feet clearance with any sheet pile cofferdams or as directed by the utility.





View of structure from the southeast approach area



Elevation view of the structure





Cracking with efflorescence and spalling on southwest abutment



Cracking and efflorescence on southeast abutment





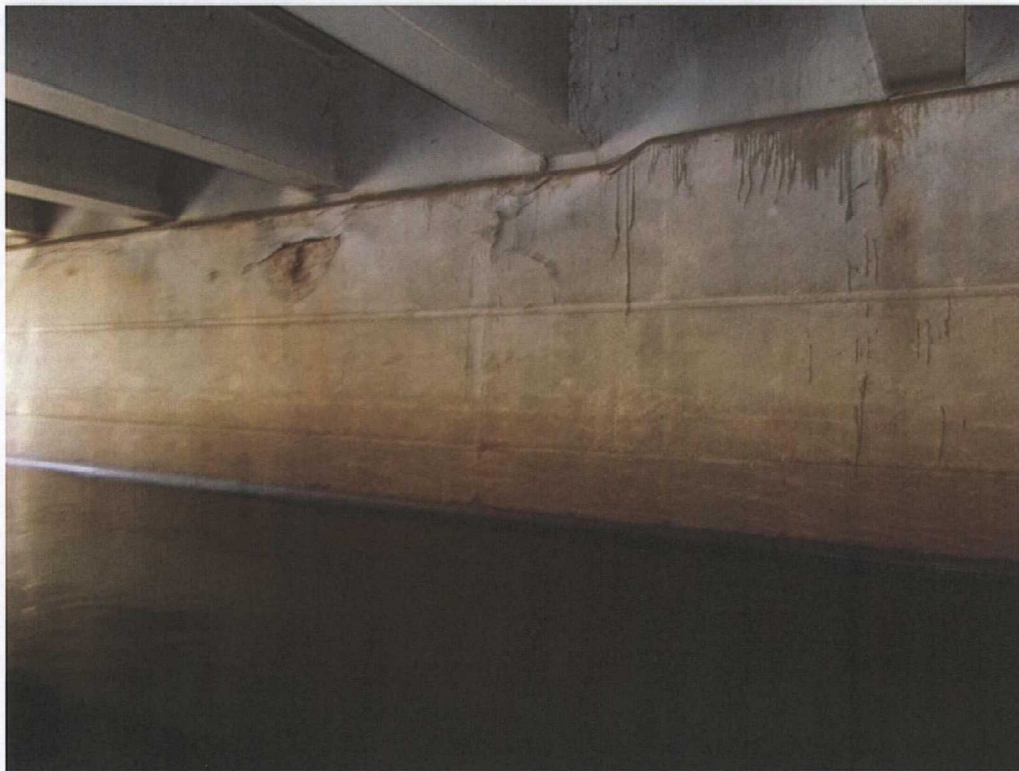
Spalling with exposed steel beneath beam 4S on west abutment



Cracking and delamination on top of abutment in southwest



Hairline cracking with efflorescence on bottom of deck



Cracking and delamination on top of abutment in southwest





Concrete outlet pipe in the southeast



Deterioration of the asphalt pavement along the east approach slab





Transverse cracking in the east concrete approach slab



ASR-type cracking in the southeast end wall





Cracking and spalling of southwest curb/sidewalk



ASR-type cracking in the southwest end wall





Deck spalling along west reference line near centerline



Failed cable railing in the southwest





View of decorative light in the northwest



Damaged area of light base in the northwest





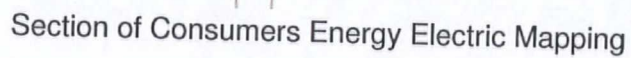
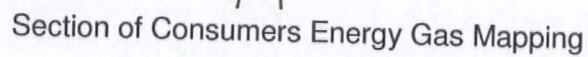
Decorative pavement in the northeast and deterioration of asphalt pavement

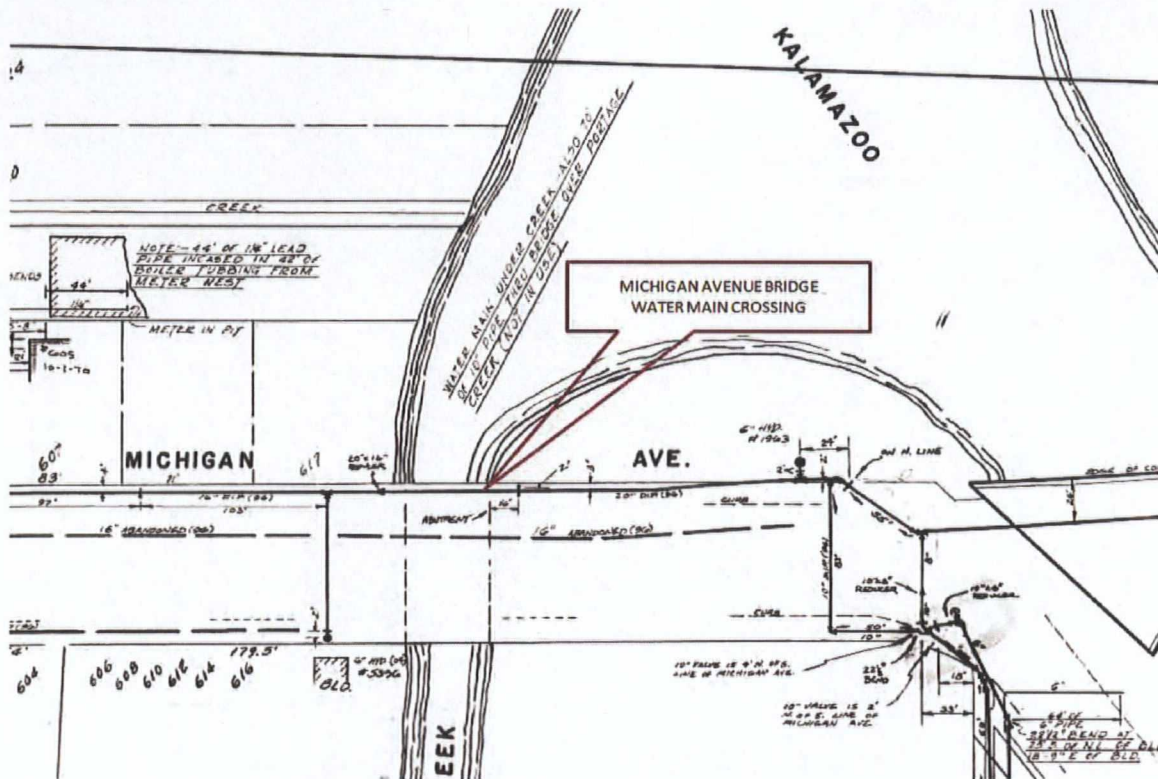


Service panel for park in the northeast

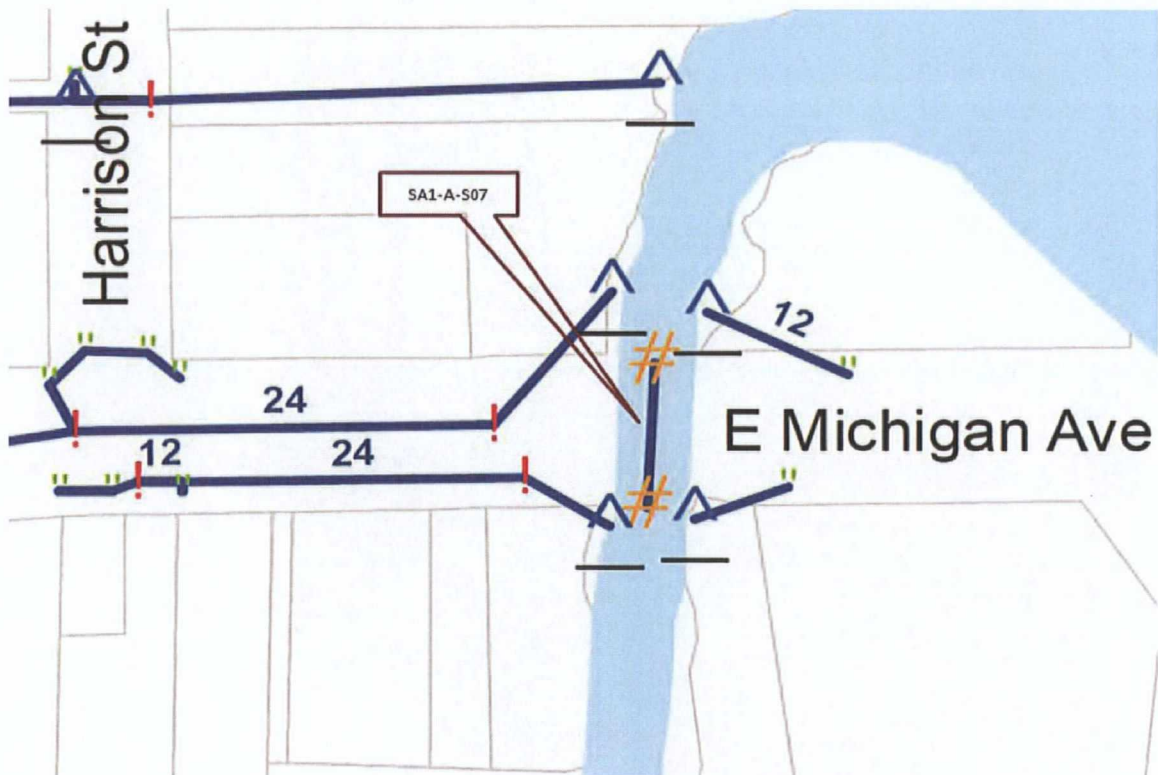


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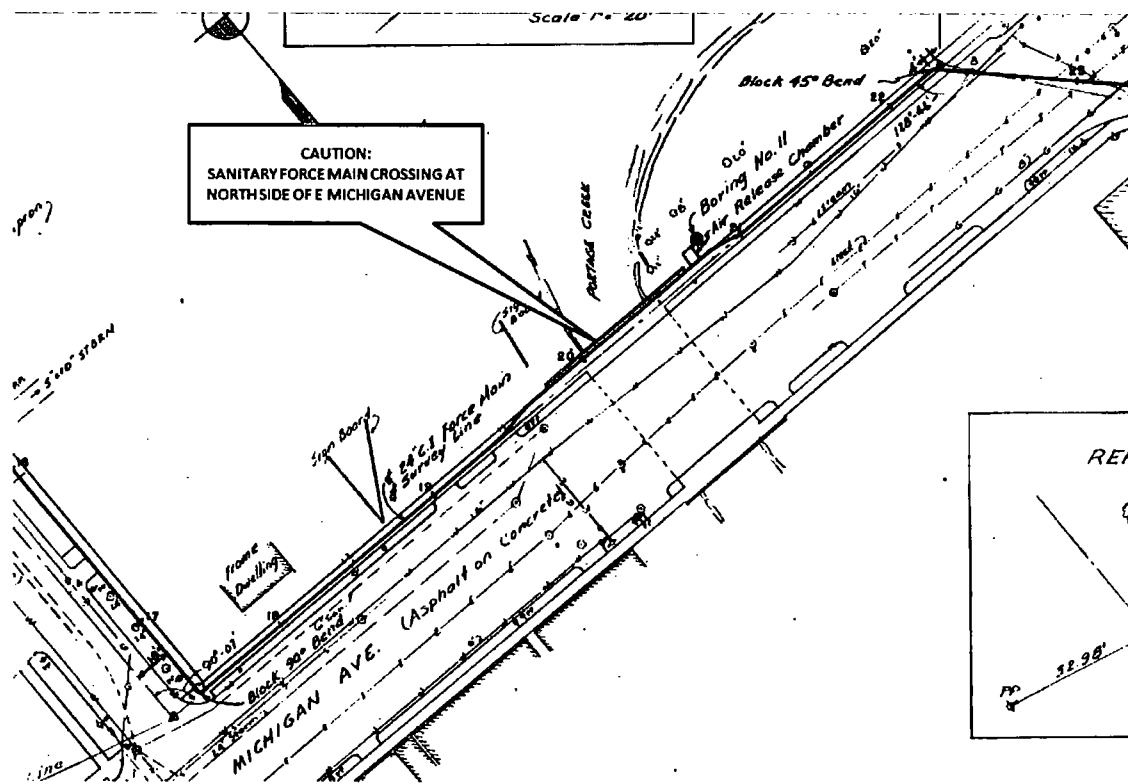


Section of City of Kalamazoo Water Main Mapping



Section of City of Kalamazoo Storm Sewer Mapping





Section of City of Kalamazoo Sanitary Sewer Mapping

Designation: SA1-A-S08

Location: SA1-A-S08 is located on the east bank of Portage Creek approximately 20 feet north of the Michigan Avenue Bridge.

Description: SA1-A-S08 is a 12-inch outlet with concrete headwall.

Pre-existing Condition:

- The pipe appears to be in fair to good condition, with minor mortar cracking at the end.
- The headwall appears to be in good condition. No undermining was detected.

Protective Measures:

- The outlet should be isolated with a cofferdam during sediment removal. A minimum clearance of 2-3' is recommended for the cofferdam.





View of structure from the channel



Close-up view of the structure

Designation: SA1-A-S09

Location: SA1-A-S09 is located along the west bank of Portage Creek, north of the Michigan Avenue Bridge.

Description: SA1-A-S09 is a series of monitoring well structures.

Pre-existing Condition:

- The structures are in fair to good condition and are located with orange flagging.

Protective Measures:

- Protect the monitoring wells as directed by the USEPA.





View of structures from the channel



View of structure from the channel





View of structures from top of bank



View of structure at top of bank looking south



Designation: SA1-A-S10

Location: SA1-A-S10 is located in the northwest quadrant of the Michigan Avenue Bridge. It is approximately 10-15' from the top of bank.

Description: SA1-A-S10 is a building with a combination of brick façade on the southern face and aluminum siding elsewhere. The southern portion of the building appears to have a concrete foundation wall. The northern portion's foundation is obscured by wood cladding.

Pre-existing Condition:

- The brick extension wall in the southeast corner has severe horizontal cracking at a mortar joint.
- The concrete foundation appears to be in fair condition.
- The aluminum siding appears to be in fair condition.
- The wood window trim is severely rotted.
- A significant amount of brush growth was noted behind the siding.
- The concrete and asphalt pavements on the north side of the building are severely deteriorated. The asphalt in particular has failed, apparently due to dumpster access.

Protective Measures:

- The building appears to be outside the influence of the sediment removal. Operators and drivers should use due care when working around the building to avoid damage from equipment.



View of structure from the channel



View of structure from the channel





Joint separation between brick and concrete foundation wall



View of brick façade on south side of structure





Horizontal cracking in southeast extension wall



View of southeast foundation wall and siding





View of foundation wall and siding



View of northeast wall of building

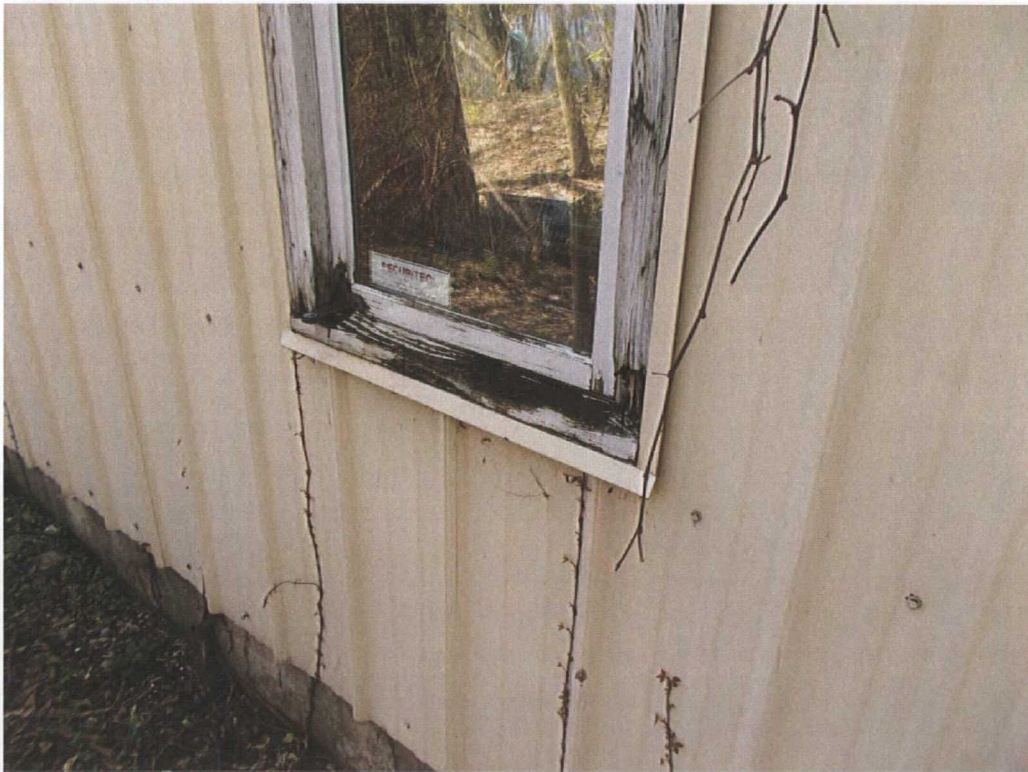


Transition between concrete foundation wall and unknown foundation



Brush growth behind aluminum siding





Severe rot on window trim



Severe rot on window trim





Tree growth along northeast wall



Washout around northeast corner of building





Failure of asphalt pavement near dumpsters



Concrete apron in northeast corner



Structure: SA1-A-S10

Date: May 1, 2013



View of structure from the northeast



Designation: SA1-A-S11

Location: SA1-A-S11 is located on the west bank of Portage Creek approximately 50' south of the Rose Park pedestrian bridge.

Description: SA1-A-S11 is a 10-foot diameter concrete storm sewer outlet.

**Pre-existing Condition:**

- There is a spalled area with exposed steel on the north side of the interior.
- The concrete has efflorescence and delamination along the waterline.
- Minor to moderate cracking was noted in the soffit area.
- The majority of the structure appears to be in fair condition.
- Assuming the structure is a complete circular section, the invert of the pipe appears to be approximately 2-3 feet below the bottom of the channel.

**Protective Measures:**

- The structure should be isolated from the creek during sediment removal to allow for dewatering. A minimum clearance of 3-4 feet is recommended for a sheet pile cofferdam, if that is the selected method of isolation.



View of structure from the channel



Spalling with exposed steel on the northern interior





Efflorescence and delamination near the waterline



Efflorescence and delamination near the waterline





Cracking in the soffit area



View of structure from the bank





Cracking and weathering of the concrete on the northern exterior

Designation: SA1-A-S12

Location: SA1-A-S12 is located on the west bank of Portage Creek approximately 20' south of the Rose Park pedestrian bridge.

Description: SA1-A-S12 is a 6-inch PVC outlet with field stone spillway.

Pre-existing Condition:

- The pipe is faded from sun exposure, but otherwise appears to be in new condition. The invert is partially buried.

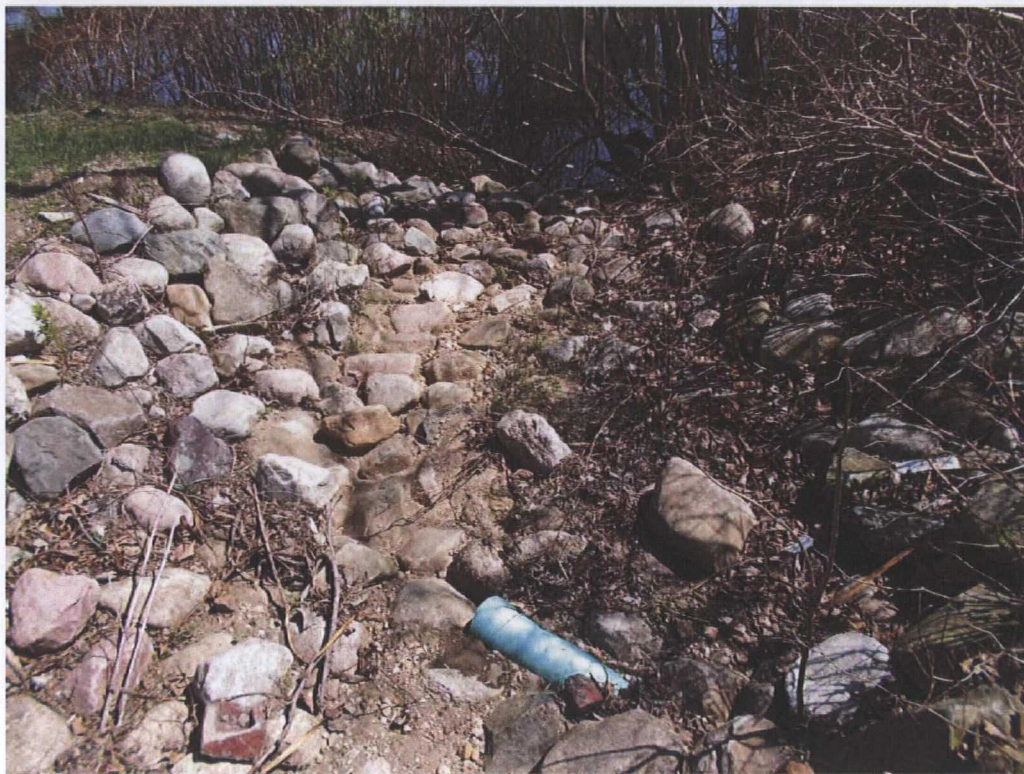
Protective Measures:

- The pipe itself is located back from the water's edge. Due to its limited capacity, it likely does not carry enough stormwater to warrant isolation. It should be protected from inadvertent damage during sediment removal.
- Field stone should be removed and replaced as required during sediment removal. It should be replaced on a geotextile liner to prevent erosion of the underlying soils.





View of structure from the water's edge



View of structure from the top of bank

Designation: SA1-A-S13

Location: SA1-A-S13 is the Rose Park pedestrian bridge.

Description: SA1-A-S13 is a single span pre-fabricated weathering steel through truss bridge with timber decking and concrete abutments. The east approach is a timber boardwalk and the west is a concrete approach slab with asphalt beyond. The west approach has weathering steel railings.

Pre-existing Condition:

- The timber decking is weathered and has minor splitting over most of its area.
- Field stone riprap is in place around both abutments.
- The concrete sidewalk connecting to the boardwalk in the southeast is undermined approximately 2" and has cracking near its end.
- Brush growth is encroaching on the southeast quadrant of the structure.
- The asphalt/concrete joint on the west approach is opening slightly. The asphalt has an isolated area of edge cracking in the southwest.
- The west backwall appears to have been sawcut/chipped to allow setting of the steel structure.
- Minor to moderate slope erosion was noted in the southwest.
- There is a split rail fence and landscaping area in the northwest.
- There is a monitoring well in the slope area northwest of the structure.
- According to the construction plans, the west abutment is supported by helical piers, with the bottom of footing approximately 9 feet below the bottom of the steel truss, or 6 feet below grade. The footing extends approximately 18 inches horizontally from the face of wall.
- According to the City, the east abutment is older and construction drawings were not available at the time of evaluation. A spread footing should be assumed, with bottom of footing approximately 4-6' below grade.
- According to plans provided by the City, there is a 36-inch cast iron sanitary force main beneath Portage Creek parallel to the pedestrian bridge.

Protective Measures:

- Because the west abutment is on a deep foundation, it is less susceptible to vibrations than one on shallow foundation. A minimum of 3-4 feet clearance is recommended between sheet pile cofferdam structures and the abutment.
- Due to its unknown support configuration, additional care should be used when working around the east abutment. A minimum clearance of 6-8' is recommended for sheet pile cofferdams in the area. It may be effective to infill between the abutment and end of sheet pile with sand bags or other shallow cofferdam measures.
- Maintain a minimum of 4-6' clearance between the sanitary force main and sheet pile cofferdams, or as directed by the City of Kalamazoo. If sediment removal is required in closer proximity, the force main should be hand exposed first to confirm its exact depth and location.





Elevation view of structure from the upstream channel



View of structure from the east approach





View of the east abutment from the channel



View of the east approach boardwalk





View of the southeast approach boardwalk

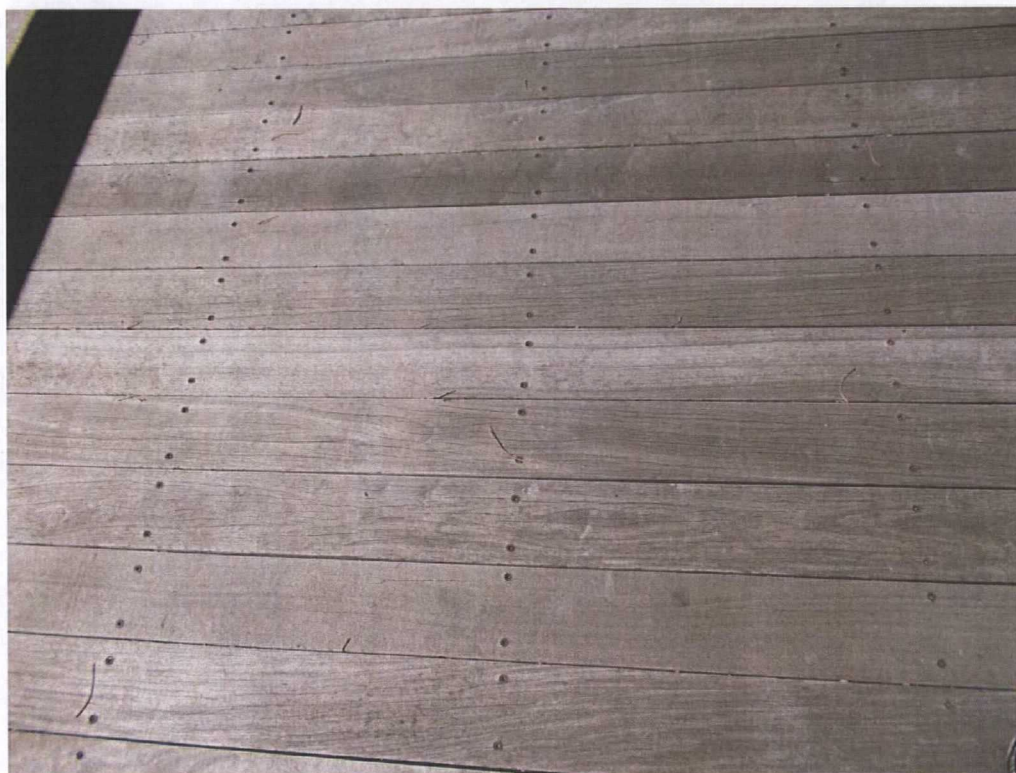


Undermined and cracked concrete sidewalk in the southeast





View of the southeast boardwalk

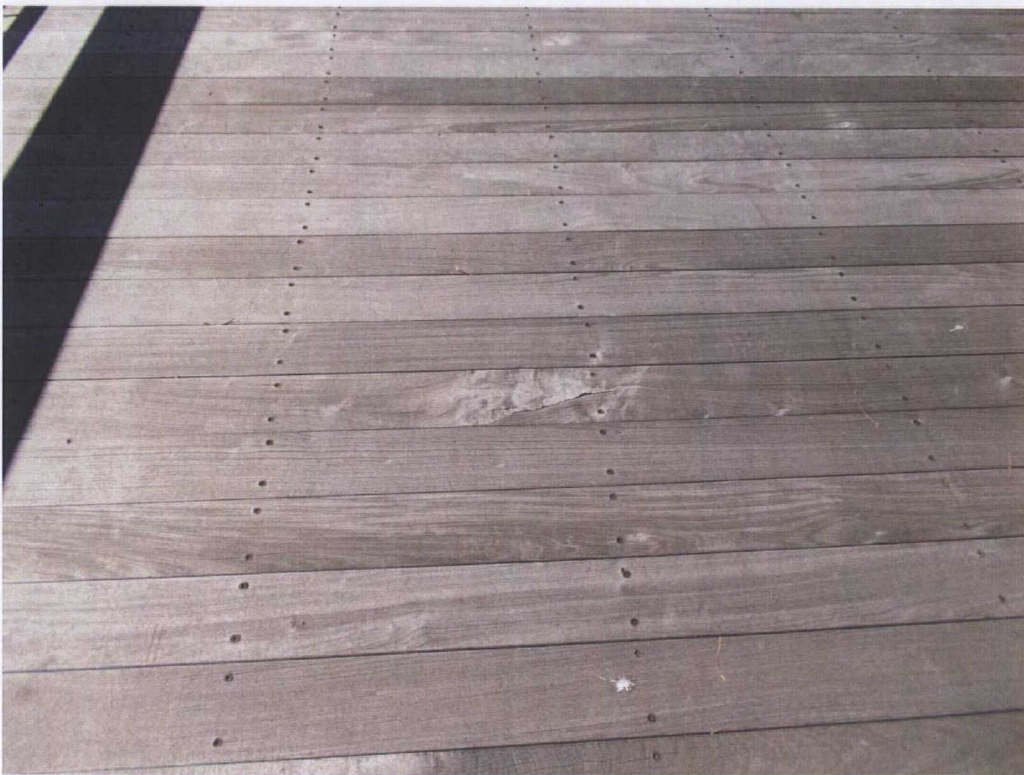


Weathering and splitting of timber decking



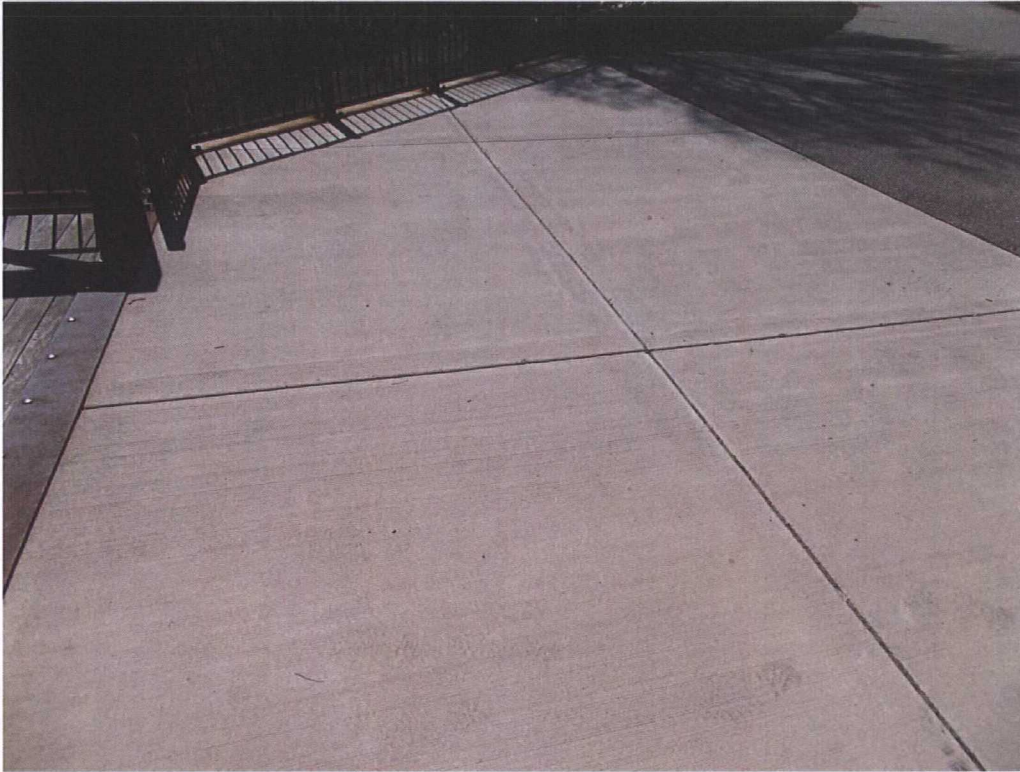


Typical view of steel truss and railing from the deck



Weathering and splitting of timber decking





View of the west concrete approach pavement



Separation along asphalt/concrete joint





View of northwest approach railing



View of structure from the northwest bank





View of structure northwest bearing area



View of the west abutment





View of east abutment from the west bank



View of southwest abutment area





Notched area of west backwall



View of structure from the west approach





Split rail fence and landscaping in the northwest



Split rail fence and landscaping in the northwest





Split rail fence and landscaping in the northwest



View of the northwest slope area





Split rail fence and landscaping in the northwest



Split rail fence and landscaping in the northwest





Split rail fence and landscaping in the northwest



Split rail fence and landscaping in the northwest





View of structure from the west approach



Edge cracking in the southwest asphalt approach area



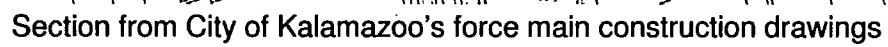


Monitoring well in the northwest



View of structure from the northwest







Designation: SA1-B-S01

Location: SA1-B-S01 is located at the top of the east bank along SA1-B.

Description: SA1-B-S01 is an area of asphalt pavement between the top of bank and several adjacent buildings.

Pre-existing Condition:

- The asphalt pavement is in fair to poor condition with cracking throughout, some of which has vegetation growth.
- Severe edge cracking and spalling was noted.
- Several areas of settlement and alligator cracking were noted.
- There is a concrete bumper at a commercial dumpster near the north end of the pavement area.

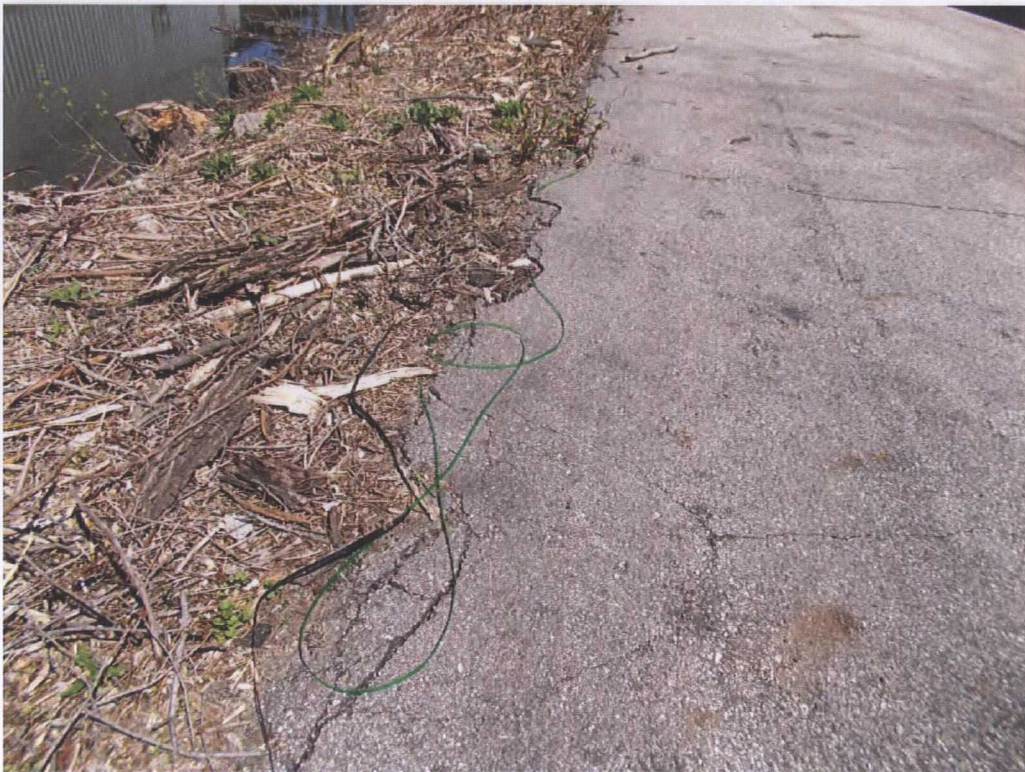
Protective Measures:

- Repair or replace damaged areas of pavement as required.





View of pavement area looking north toward SA1-B

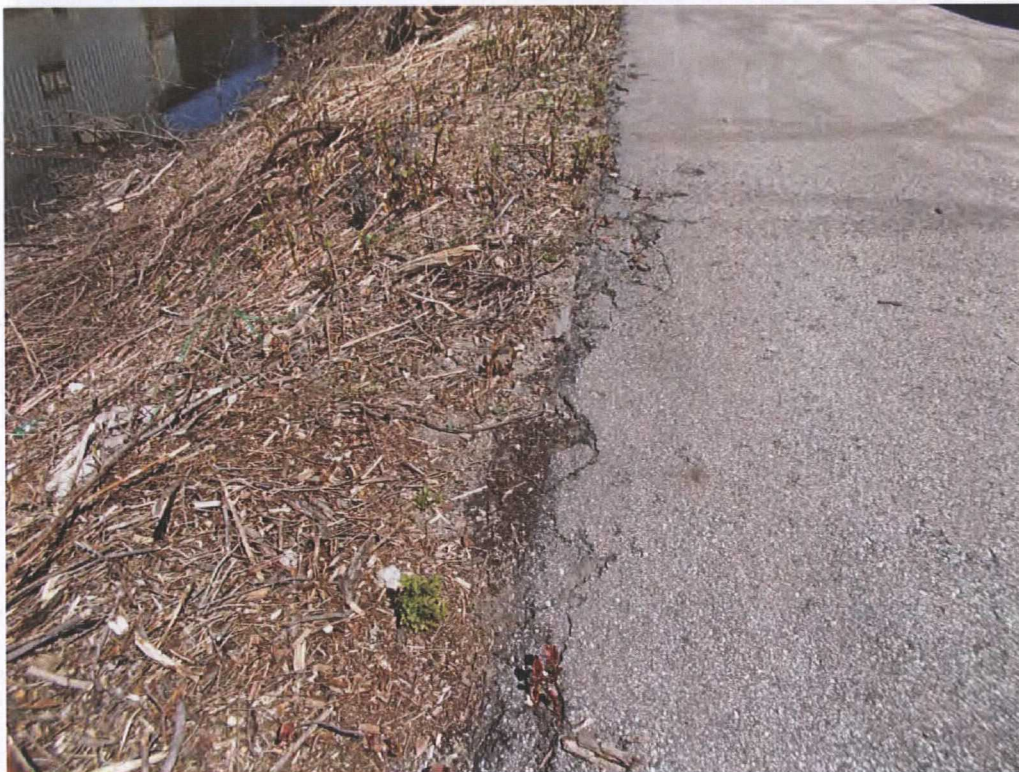


Edge cracking and spalling





Edge cracking and random cracking in pavement



Edge cracking and spalling





Area of severe settlement



Severe edge cracking and spalling





Alligator cracking near edge of pavement



Random cracking in pavement





Pavement at south end of SA1-B

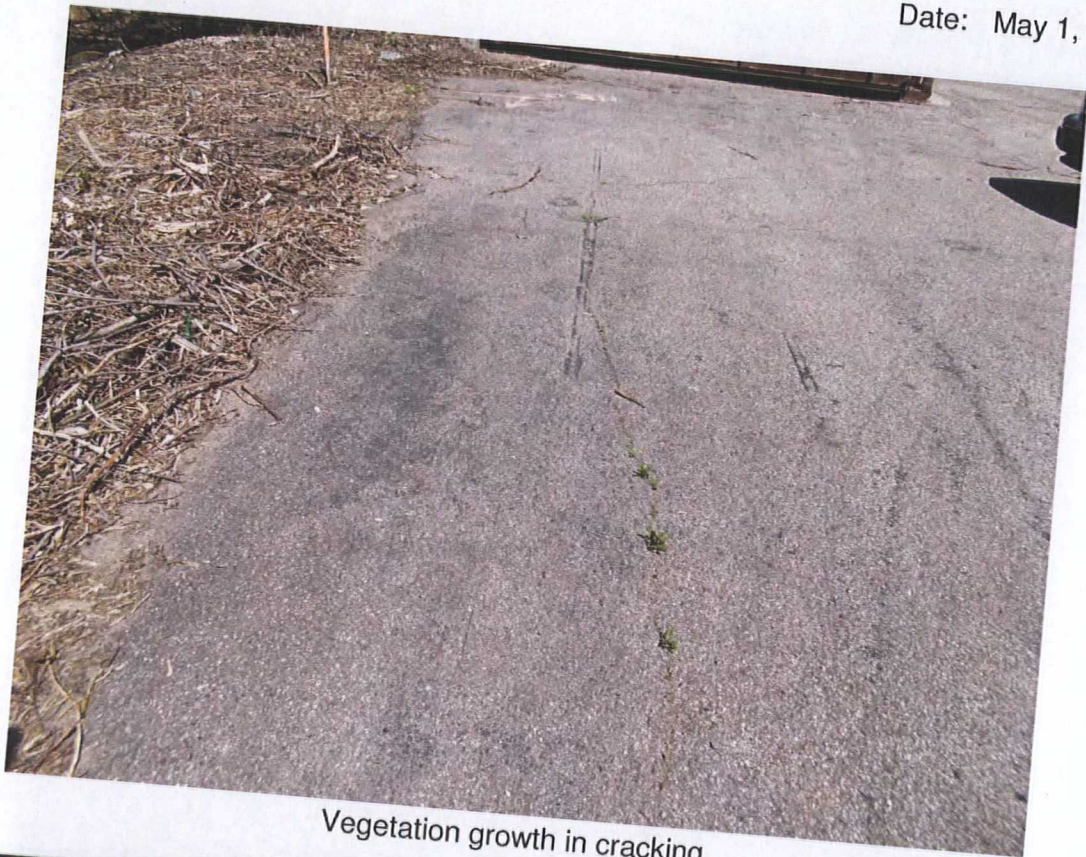


Random cracking in pavement

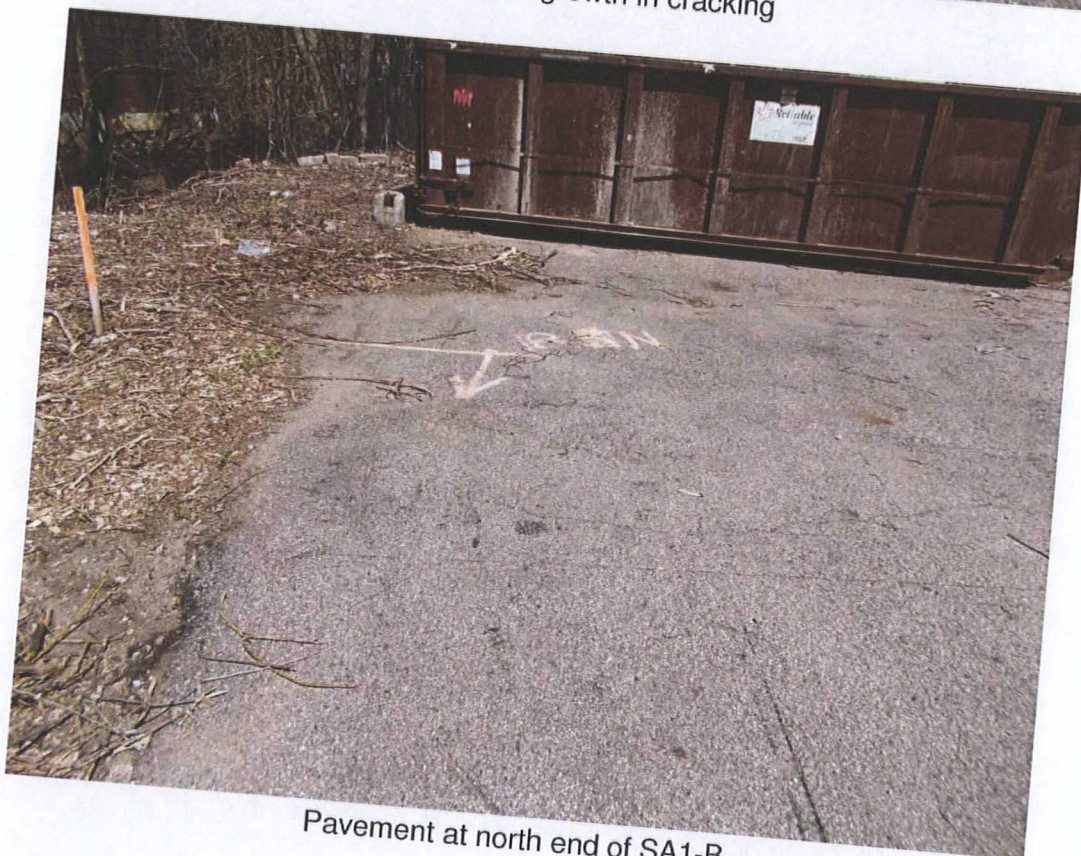


Structure: SA1-B-S01

Date: May 1, 2013



Vegetation growth in cracking



Pavement at north end of SA1-B





Random cracking in pavement



Concrete bumper and commercial dumpster north of SA1-B





View of pavement north of SA1-B



Designation: SA1-B-S02

Location: SA1-B-S02 is located on the east bank of Portage Creek approximately 50 feet north of the railroad bridge at the north end of SA1C.

Description: SA1-B-S02 is a 15-inch clay tile outlet.

Pre-existing Condition:

- The outlet is surrounded by the remains of a suspected concrete block headwall.
- Moderate slope erosion was noted around the outlet.
- The pipe is in fair condition. The bottom of pipe is cracked and spalling at the exposed end.

Protective Measures:

- This structure is located south of the southern limits of SA1-B and should be protected from inadvertent damage during sediment removal.





Outlet viewed from the upper bank



View of the outlet from the channel





Close-up view of outlet



Designation: SA1-B-S03

Location: SA1-B-S03 is located along the west bank of Portage Creek in the area of SA1-B.

Description: SA1-B-S03 is an industrial building. There are two distinct building sections. The southernmost section has a concrete foundation wall with exposed form ties, all but the north end of which is protected by steel sheet pile. The foundation of the northern section is obscured by a series of corrugated metal sheets attached to the building.

**Pre-existing Condition:**

- The siding on the southern portion is buckled and damaged throughout.
- The corrugated siding on the northern section has moderate to severe surface corrosion. It is bent back near the transition between sections and generally in poor condition.
- The channel is 3.5-4.0 feet below the top of sheet pile.
- The concrete foundation wall has moderate honeycombing at pour joints. There is an area of critical vertical cracking with a 2" offset in the wall near the change in roof lines. There is a moderate vertical crack near the north end of the sheet pile.
- The bank north of the sheet pile is mostly intact due to a series of large trees and stumps. The footing of the northern end of the concrete foundation wall is exposed approximately 8-12 inches.
- There is an apparent column foundation in the northern section which is located well above the waterline and appears to be severely undermined.

**Protective Measures:**

- Due to the limited sediment removal depth (approximately 1 foot), it should be possible to remove sediment against the sheet pile wall without disturbing it.
- It is recommended that the bank north of the sheet pile wall be left intact to avoid impacting the unknown foundation for the northern section of the building. If the bank cannot be left in place, a longitudinal cofferdam is recommended along the building with a minimum clearance of approximately 4 feet.
- Avoid excavation within 3-4 feet of the exposed concrete footing to prevent undermining or other disturbance.





View of south end of structure from east bank



View of area of critical cracking in concrete foundation from east bank





View of building transition from east bank

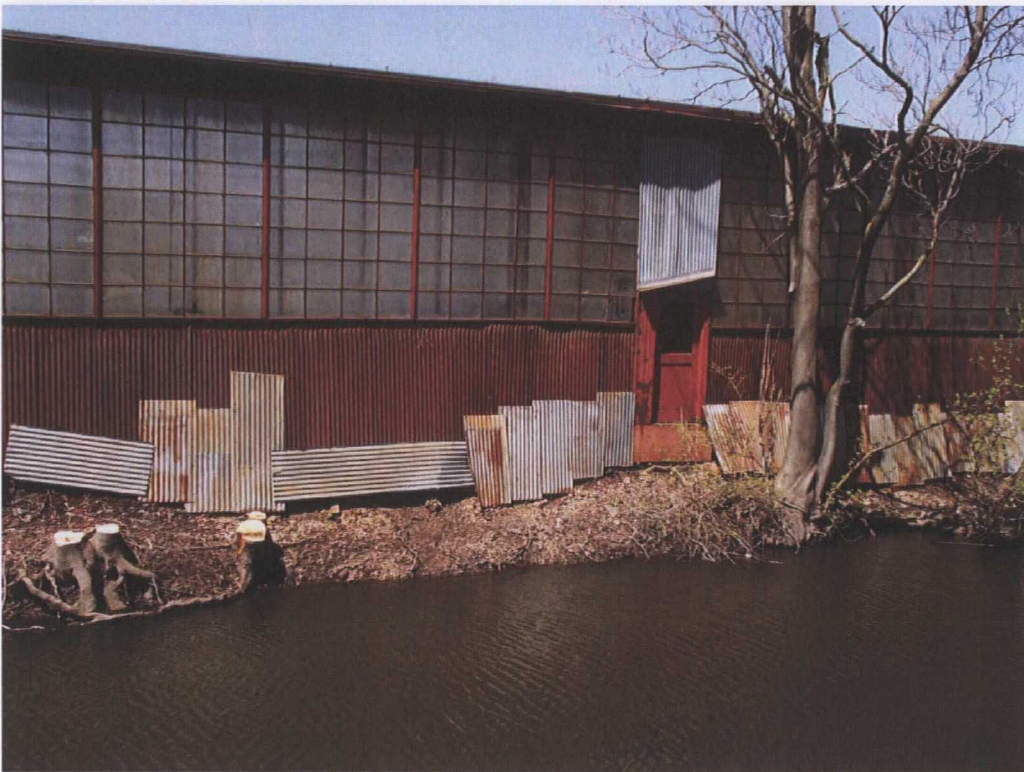


View of building transition from east bank



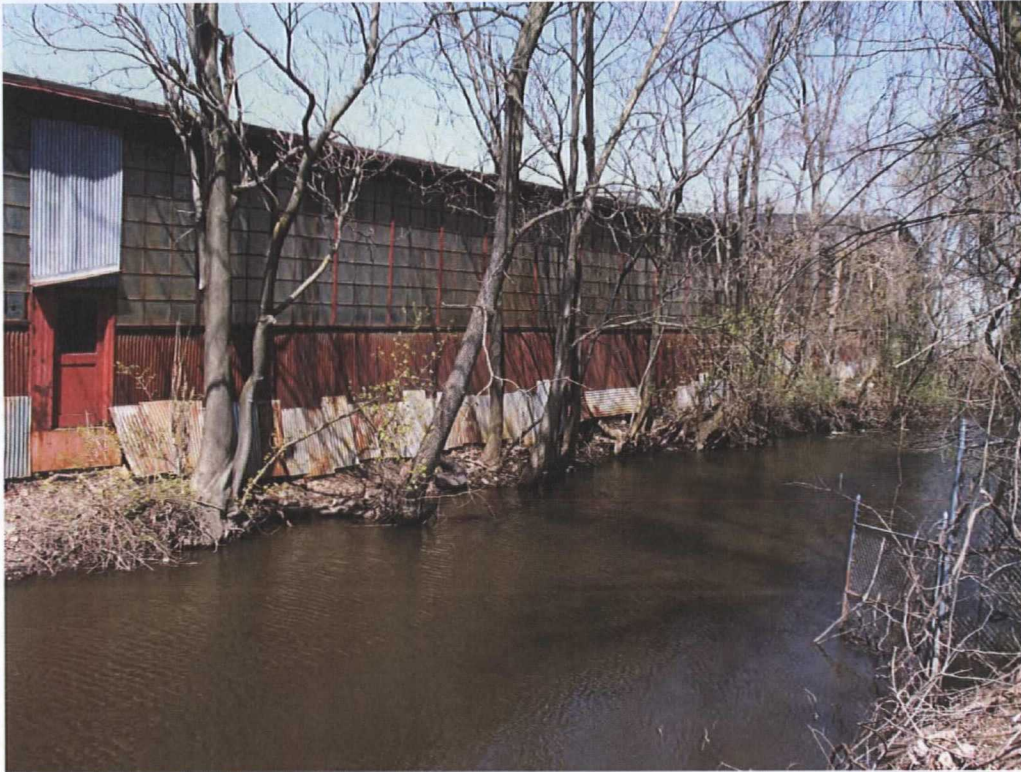


View of south end of northern section from east bank



View of northern section from east bank



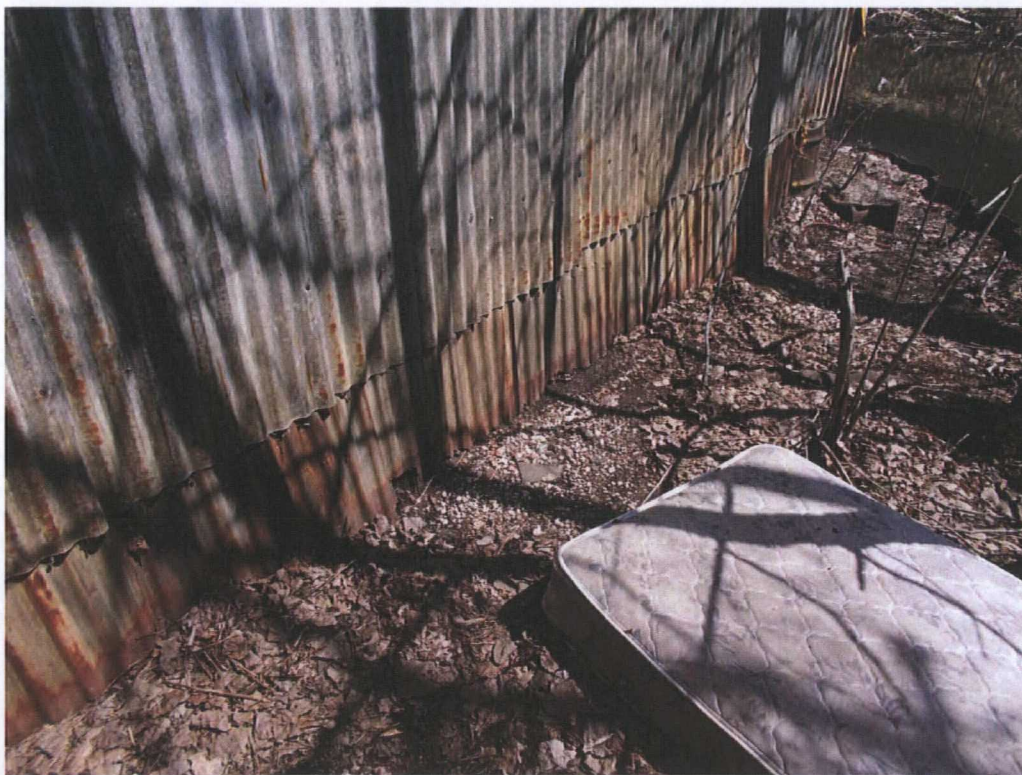


View of trees supporting the west bank



South end of sheet pile at southeast corner of building





Corrugated siding on south face of building



Suspected steel drum filled with concrete in southeast foundation





View of concrete foundation wall looking north



Area of critical cracking in concrete foundation wall





View of offset at critical cracking looking down

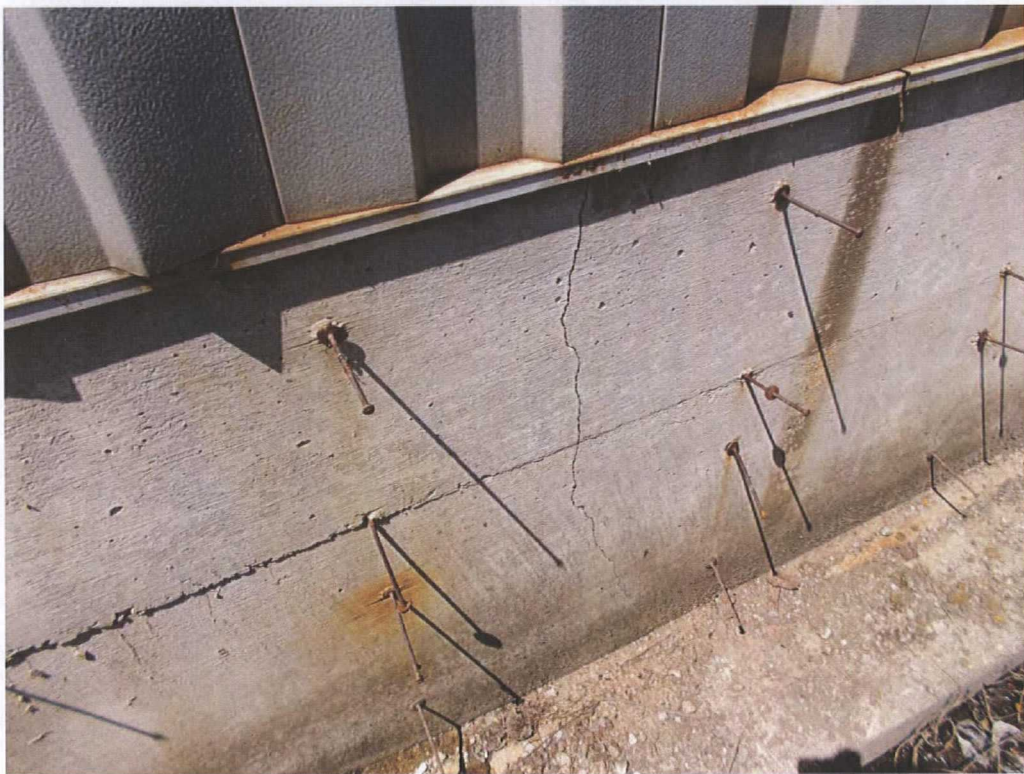


Exposed footing at north end of southern section of building





Exposed footing at north end of southern section of building



Moderate vertical cracking near north end of sheet pile



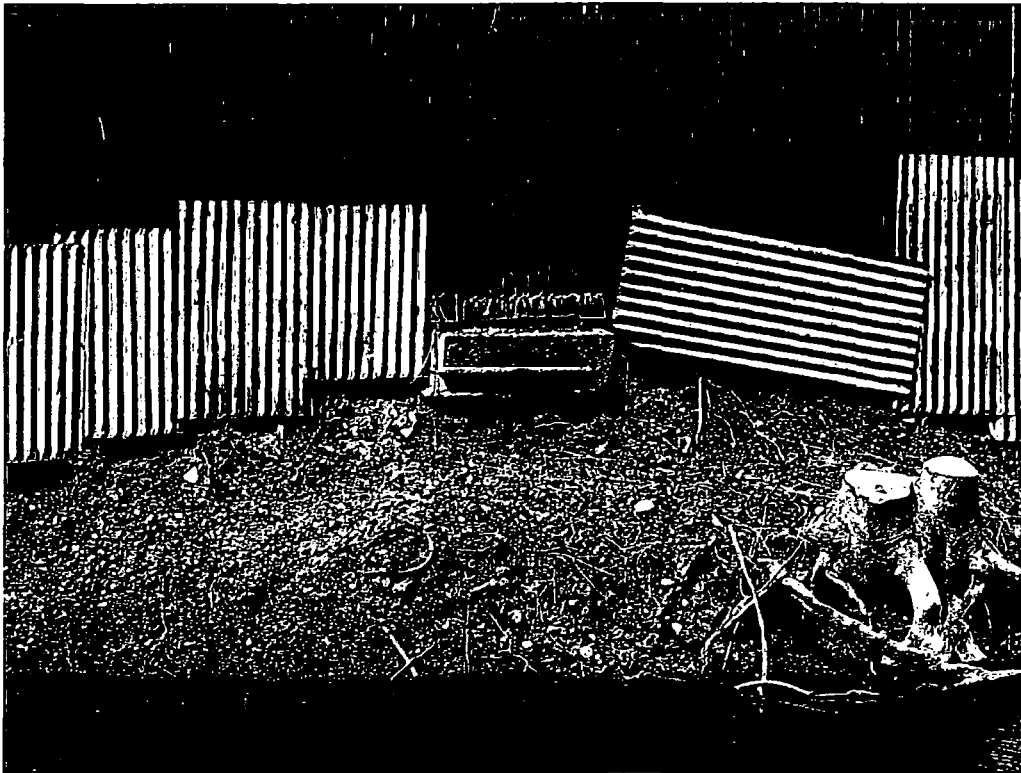


Bent corrugated siding at building transition



View of suspected column footing in northern section looking north





View of suspected column footing in northern section from east bank



Designation: SA1-B-S04

Location: SA1-B-S04 is located at the top of the east bank of Portage Creek near the center of SA1-B.

Description: SA1-B-S04 is guy pole and guy wire.

Pre-existing Condition:

- The guy pole has a slight easterly lean.
- The pole and guy appear to be in fair condition.

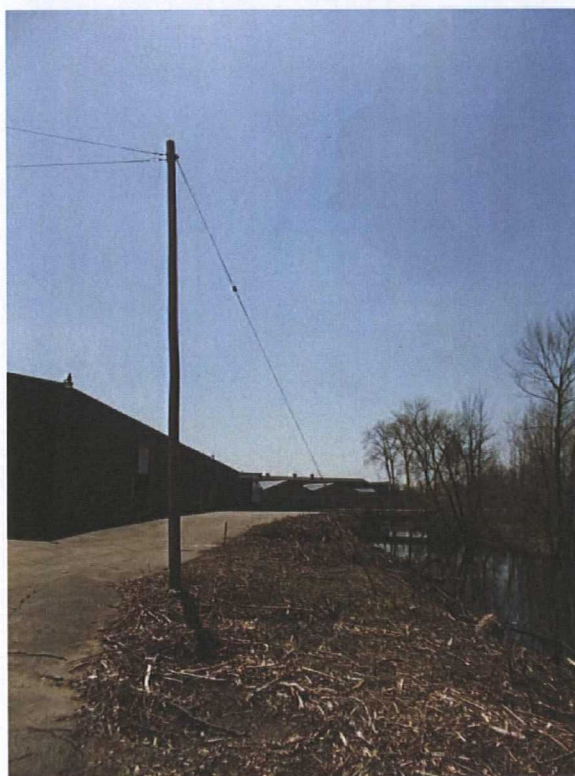
Protective Measures:

- The guy pole and wire appear to be beyond the influence of the sediment removal in the area due to its shallow nature. Construction fencing or similar means should be used to identify the pole and guy to operators and drivers during the work.





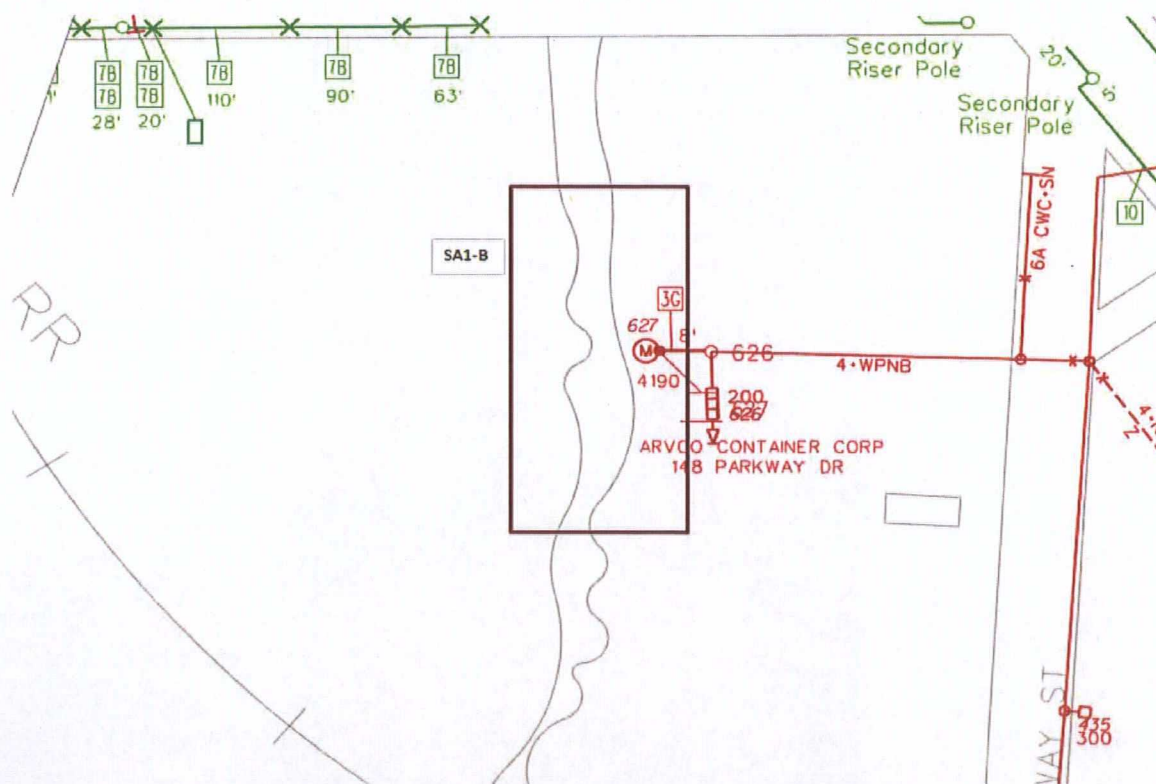
View of the guy pole and wire looking north



View of the guy pole and wire looking south



Date: May 1, 2013



Section from Consumers Energy Electrical Mapping



Designation: SA1-B-S05

Location: SA1-B-S05 is located on the east bank of Portage Creek near the north end of SA1-B.

Description: SA1-B-S05 is a corrugated PVC outlet extending from the bank.

Pre-existing Condition:

- The outlet is exposed approximately 3-4 feet from the bank and deflects down into the channel area.

Protective Measures:

- Based on its limited capacity, this outlet likely does not need to be isolated for sediment removal.
- It is recommended that the pipe be cut back near the bank to accommodate sediment removal operations.



Designation: SA1-B-S06

Location: SA1-B-S06 is located on the east bank of Portage Creek approximately 20 feet north of SA1-B.

Description: SA1-B-S06 is an 8-foot high chain link fence with barb wire oriented perpendicular to Portage Creek. The west end of the fence is within the channel area.

Pre-existing Condition:

- The fence is in fair to good condition.
- The west end of the fence in the channel appears to be deflected to the north, presumably from impact by channel debris.

Protective Measures:

- The fence is located north of SA1-B and is not likely to conflict with sediment removal operations. However, if the fence does conflict, it should be removed and replaced in kind.



Structure: SA1-B-S06

Date: May 1, 2013



View of the fence looking north



Designation: SA1-C-S01

Location: SA1-C-S01 is located along the east bank of Portage Creek at the south end of SA1-C.

Description: SA1-C-S01 is an industrial building. The building is located at the water's edge upstream of SA1-C but angles away from the channel in the area of work. The building is brick/block construction on concrete foundation wall.

Pre-existing Condition:

- Minor cracking, severe honeycombing and exposed form ties were noted in the concrete foundation wall.
- The footing is exposed upstream of SA1-C. Minor undermining was noted at the building transition.
- Moderate vertical and step cracking were noted in the brick. Cracking was noted in the primary wall and originating at window penetrations.
- A minor horizontal crack was noted between the concrete foundation and brick near the building transition.
- The eastern section of the building has sealed diagonal/step cracking near the fence line.
- Consumers Energy mapping shows a 2" gas crossing Portage Creek, however it appears to be west of SA1-C-S01 and outside the cofferdam limits.
- City of Kalamazoo mapping shows a water main crossing Portage Creek, however it appears to be west of SA1-C-S01 and outside the cofferdam limits.

Protective Measures:

- Maintain 4-6 feet minimum clearance between the southern sheet pile cofferdam and the building. Based on the configuration of the building in relation to the field staking, this should be achievable.
- Utilize Miss Dig flagging to confirm that the gas and water main crossings are beyond the cofferdam limits.





View of structure from northwest

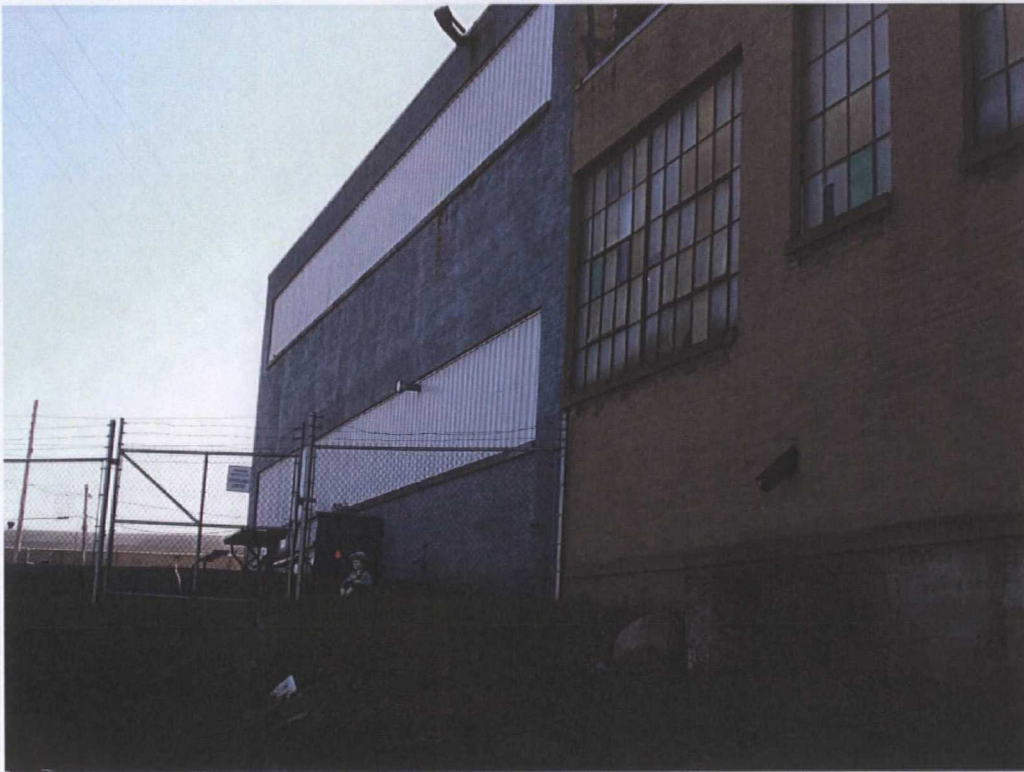


Overall view of structure from the north





Concrete foundation wall adjacent to the channel



View of structure looking east





Step cracking in brick wall



Sealed step/diagonal cracking in brick wall





Cracking at window penetration



Exposed footing near building transition





Cracking between foundation and brick



Joint separation at building transition



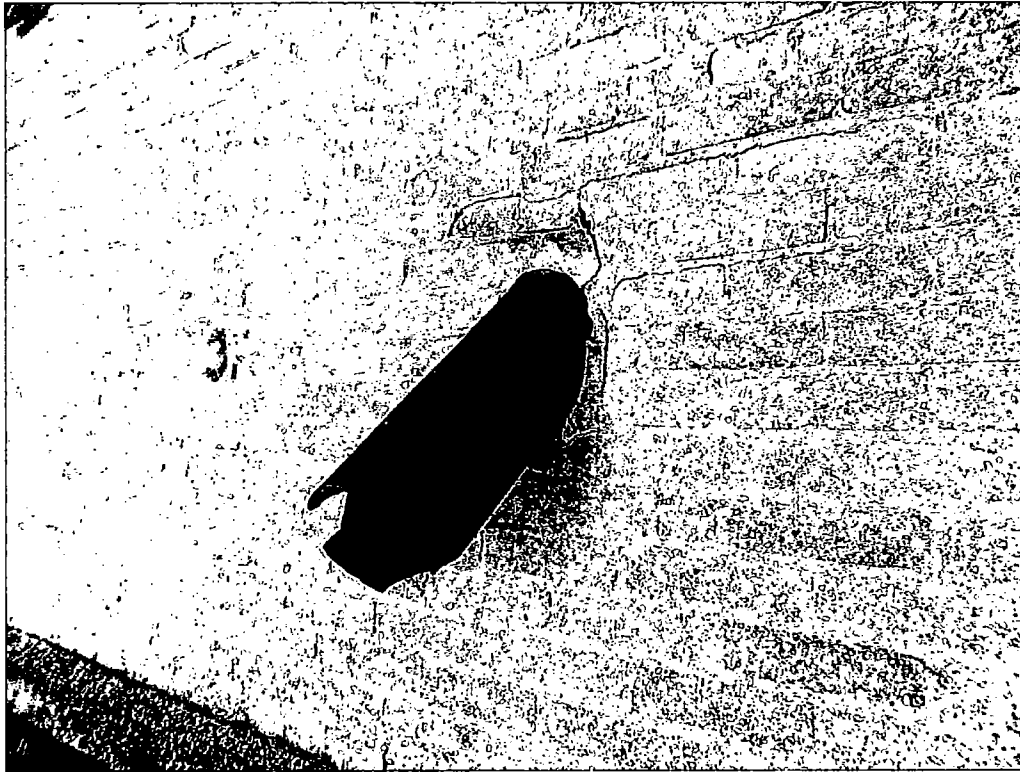


Footing undermining at building transition

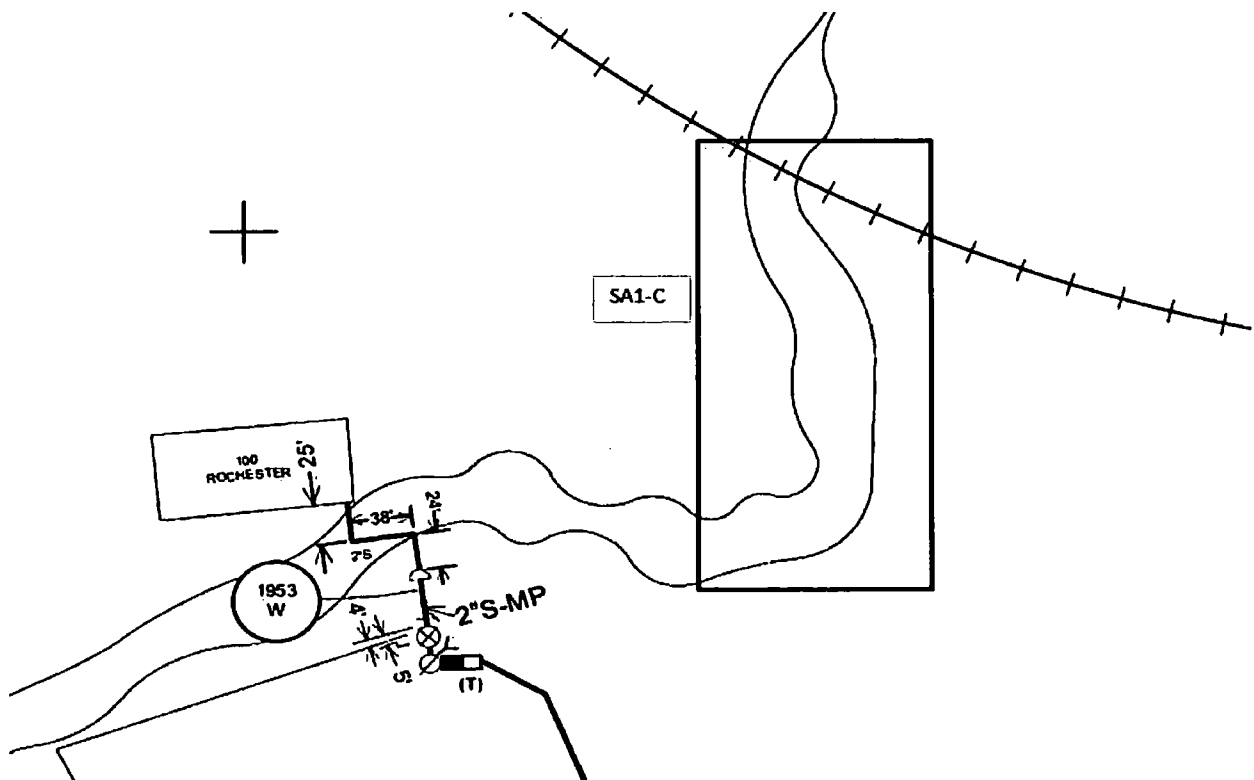


Cracking and patched spalling on face of foundation wall





Cracking around pipe penetration in brick wall

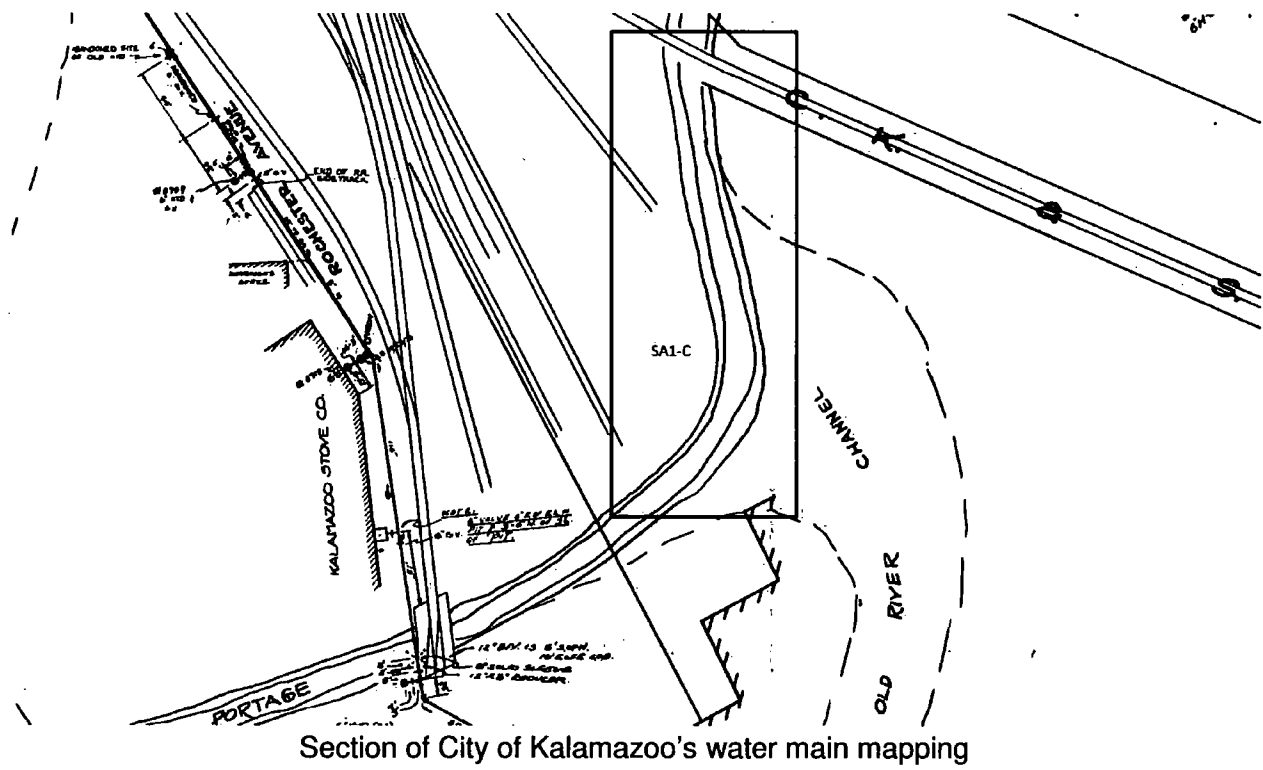


Section of Consumers Energy gas mapping for the area



Structure: SA1-C-S01

Date: May 1, 2013



Section of City of Kalamazoo's water main mapping



Designation: SA1-C-S02

Location: SA1-C-S02 is located along the east bank of Portage Creek at SA1-C.

Description: SA1-C-S02 is a 6-foot high chain link fence with barb wire.

Pre-existing Condition:

- The fence is generally in good condition, however, the barb wire has failed at the north end.

Protective Measures:

- If the fencing conflicts with sediment removal operations, it should be removed and replaced in kind.





View of fence looking north



View of fence looking north





Failed barb wire at north end of fence



View of fence looking south



Designation: SA1-C-S03

Location: SA1-C-S03 is located on the west bank of Portage Creek at the south end of SA1-C.

Description: SA1-C-S03 is an area of concrete pavement.

Pre-existing Condition:

- The pavement appears to be abandoned. It is in fair condition with scattered minor to moderate cracking.
- The top of bank is eroded along the channel side of the pavement.
- There is a 2-3" void in the interior area of the pavement.
- A stone access road has been constructed around the pavement.

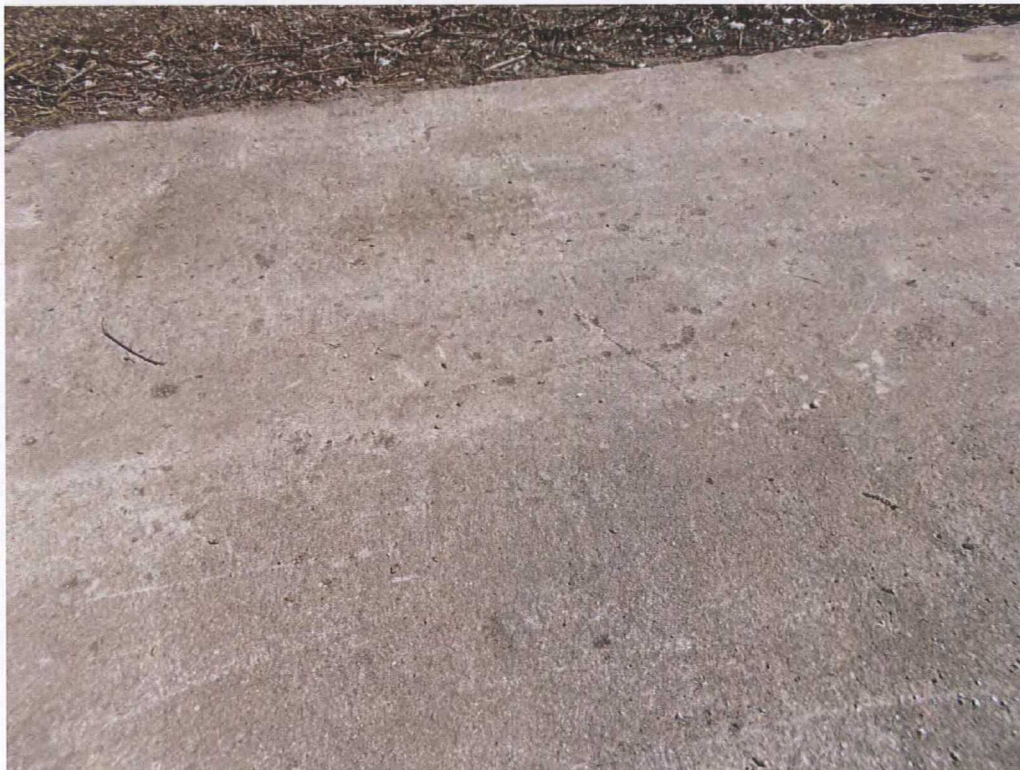
Protective Measures:

- The pavement appears to be abandoned. Any damage done during sediment removal operations does not likely need to be addressed.





View of pavement looking south



Cracking in surface of pavement





Cracking in surface of pavement



Minor spalling on corner of pavement





Erosion of top of bank along pavement



Void on interior area of pavement

Designation: SA1-C-S04

Location: SA1-C-S04 is located on the west bank of Portage Creek at the south end of SA1-C.

Description: SA1-C-S04 is an abandoned railroad track.

Pre-existing Condition:

- The track appears to be in fair condition, however, the rails are almost completely covered with soil and debris.

Protective Measures:

- The track appears to be abandoned. Any damage done during sediment removal operations does not likely need to be addressed.





View of track from adjacent pavement



View of track looking southeast



View of track looking north



Designation: SA1-C-S05

Location: SA1-C-S05 is located at the top of the west bank of Portage Creek approximately 20' north of the south end of SA1-C.

Description: SA1-C-S05 is an area of concrete pavement.

Pre-existing Condition:

- The pavement is in critical to failed condition with alligator cracking and spalling throughout.

Protective Measures:

- The pavement appears to be abandoned. Any further damage done during sediment removal operations does not likely need to be addressed.





View of pavement looking north



Severe cracking and spalling of pavement





Severe cracking of pavement



Severe cracking and spalling of pavement





Patched area on interior area of pavement

Designation: SA1-C-S06

Location: SA1-C-S06 is located on the east bank of Portage Creek approximately 30' north of the south end of SA1-C.

Description: SA1-C-S06 is a utility pole and guy wire with associated overhead lines.

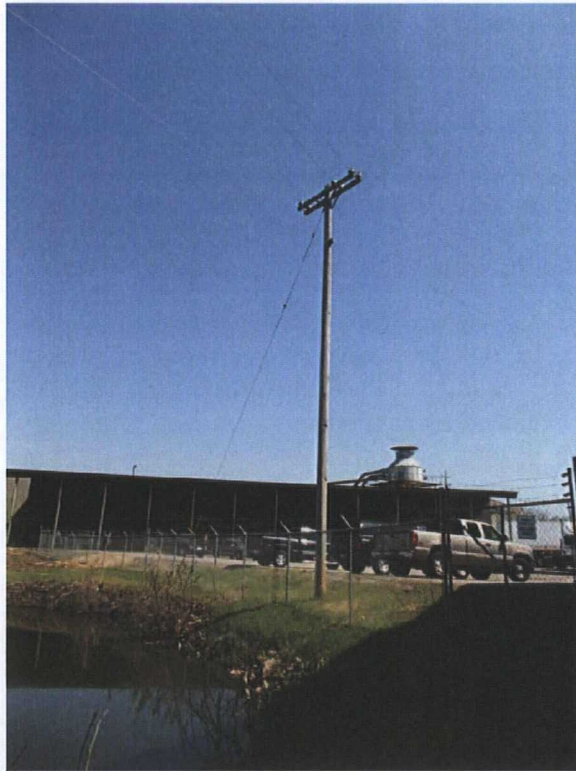
Pre-existing Condition:

- The pole is weathered but otherwise appears to be in fair condition.

Protective Measures:

- The pole appears to be beyond the influence of the sediment removal in the area. However, the guy is located near the water's edge. Sediment removal should be avoided within the 1:1 influence of the guy unless the pole is temporarily supported.
- Construction fencing or similar means should be used to identify the pole and guy to operators and drivers during the work.
- Due care should be used to avoid encroaching on the OSHA-mandated clearance for the overhead lines during sediment removal operations.





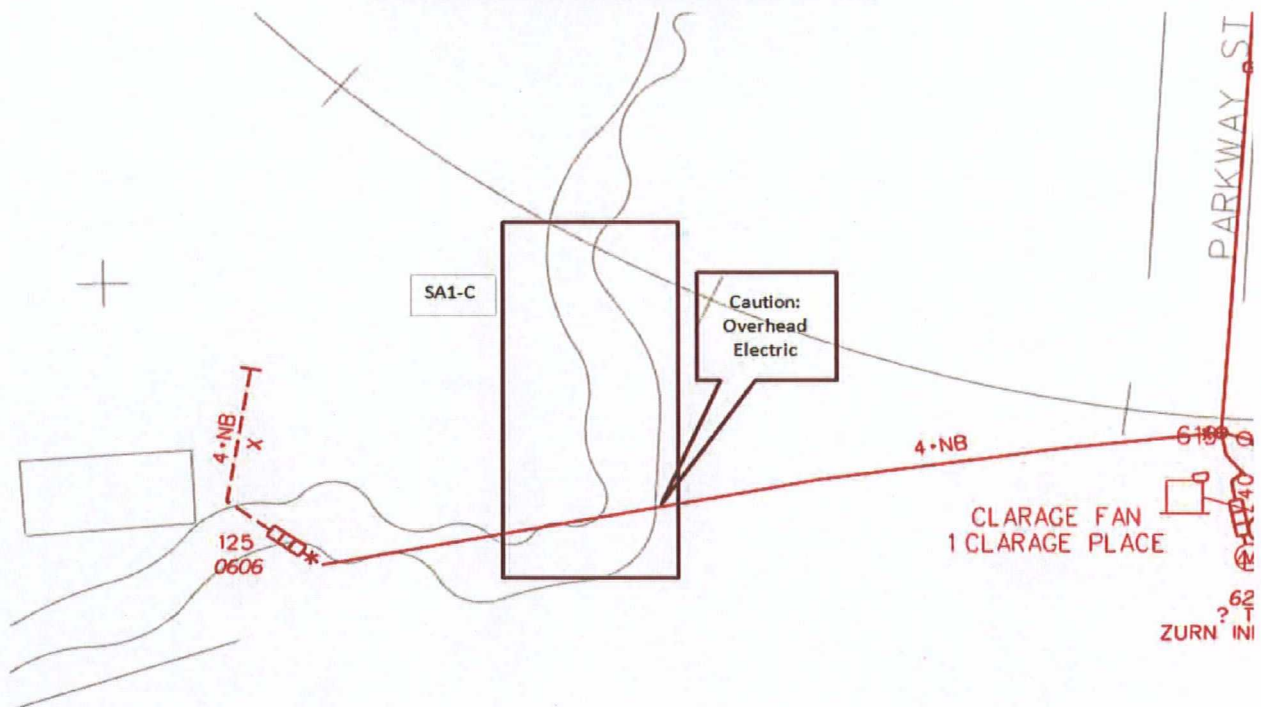
View of pole and guy looking northeast



View of guy wire demonstrating proximity to the channel area



View of pole and guy looking south



Section from Consumers Energy Electric Mapping



Designation: SA1-C-S07

Location: SA1-C-S07 is located on the west bank of Portage Creek 20' south of the railroad bridge.

Description: SA1-C-S07 is concrete block and chain link fence of unknown purpose.

Pre-existing Condition:

- The block and fence have failed and are falling into the channel area.

Protective Measures:

- It is likely that the block and fence can be removed in conjunction with sediment removal operations.



View of structure looking south



View of structure looking north



Designation: SA1-C-S08

Location: SA1-C-S08 is located at the north end of SA1-C.

Description: SA1-C-S08 is a railroad bridge. The structure has steel beams on concrete/stone abutments, timber ties and timber railing on the north side. It is suspected that the abutments are supported on spread footings, possibly stone construction.

**Pre-existing Condition:**

- The upper concrete abutments have moderate weathering. The lower stone abutments have grout voids, many of which have been patched. No undermining was detected.
- The steel beams have minor to moderate surface corrosion.
- Timber ties have severe to critical rot and section loss.
- The timber railing has a failed top plate the entire east half of the structure.
- The structure carries two sets of steel tracks, as it is located near a switch.
- Heavy brush is encroaching on the structure.
- Moderate to severe slope/bank erosion was noted all 4 quadrants. The channel spans abutment to abutment with no bank in place at the structure.

**Protective Measures:**

- Due to the unknown foundation configuration, a minimum clearance of 5 feet is recommended for installation of the northern sheet pile wall. However, because the structure appears to be abandoned, settlement is not likely a significant concern if less clearance is required.



View of the structure from the southeast



Elevation view looking northeast





Severe section loss on timber ties



Bank erosion around corner of structure





Corrosion on fascia beam



Patching on stone foundation





Corrosion on steel beams



Deterioration of concrete abutment in bearing area





Voids in stone foundation



Patching on stone foundation





Fencing in northeast quadrant



View of timber railing from channel



Failed top plate on timber railing



Designation: SA1-C-S09

Location: SA1-C-S09 is located just upstream of SA1-C along the south/east bank. It is several feet above the normal water line.

Description: SA1-C-S09 is a pipe outlet extending from the concrete retaining wall along the south/east bank. It was identified by EQM while mobilizing for work in SA1-C, when water conditions were more favorable than during the original evaluation.

Pre-existing Condition:

- The top of the pipe has been broken over approximately half of the length that extends from the concrete retaining wall.

Protective Measures:

- Because it is located upstream of the cofferdam and above the water line, any flow from the outlet will be handled by the adjacent bypass pumping. Therefore, an isolation cofferdam is not required.



View of the outlet from the north bank with bypass sumps in the foreground



Designation: SA1-C-S10

Location: SA1-C-S10 is located at SA1-C-S01, on the south/east bank of Portage Creek at the upstream end of SA1-C. The outlets are between the normal water line and several feet above the normal water line.

Description: SA1-C-S10 is a series of outlet pipes in the foundation wall of SA1-C-S01. They were identified by EQM while mobilizing for work in SA1-C, when water conditions were more favorable than during the original evaluation.

Pre-existing Condition:

- The outlets appear to be in fair condition. The easternmost outlet has been abandoned.

Protective Measures:

- Because the outlets are located upstream of the cofferdam, any flow from the outlet will be handled by the adjacent bypass pumping. Therefore, an isolation cofferdam is not required.



View of the outlets from the north bank



Designation: SA1-C-S11

Location: SA1-C-S11 is located at SA1-C-S01, on the south/east bank of Portage Creek at the upstream end of SA1-C. The outlet is near the normal water line.

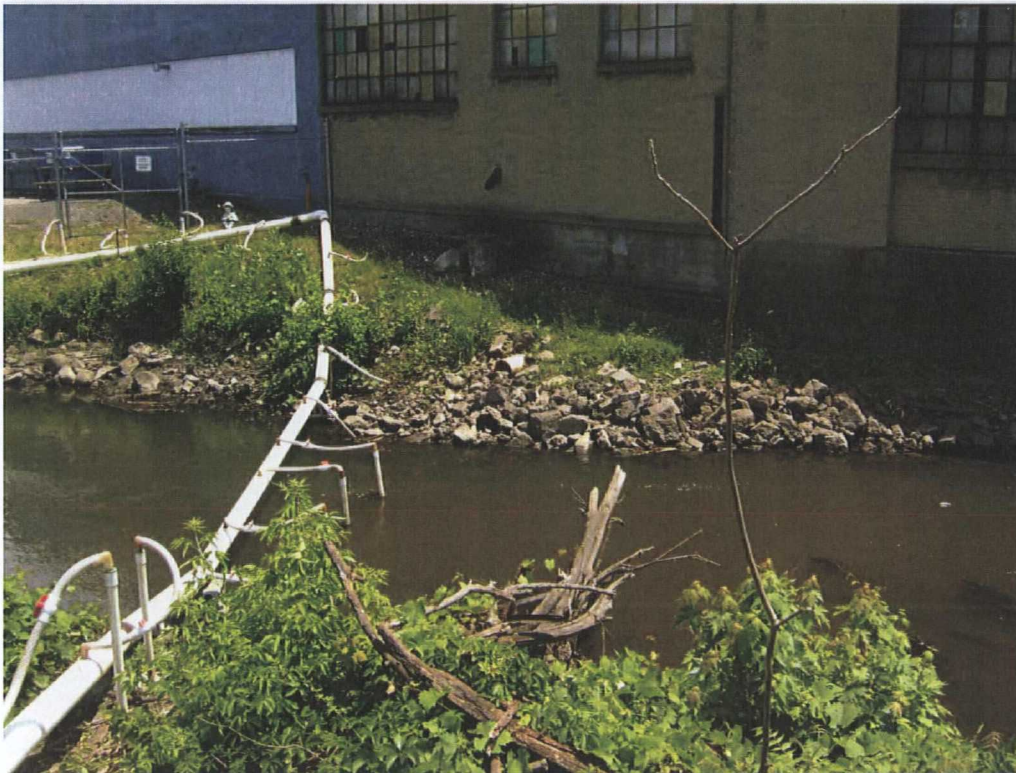
Description: SA1-C-S11 is 12-inch outlet pipe between the foundation wall of SA1-C-S01 and the water's edge. It was identified by EQM while mobilizing for work in SA1-C, when water conditions were more favorable than during the original evaluation.

Pre-existing Condition:

- The outlet appears to be in fair condition. Approximately 2' of the top of pipe is exposed.

Protective Measures:

- If an isolation cofferdam is required, it should be placed with a minimum 3 feet clearance to the outlet.



View of the outlet from the north bank (dewatering equipment on the left)



Designation: SA1-C-S12

Location: SA1-C-S12 is located at SA1-C-S01, on the south/east bank of Portage Creek at the upstream end of SA1-C. It is located approximately 2 feet above the normal water line.

Description: SA1-C-S12 is a 12-inch outlet pipe with concrete headwall. It was identified by EQM while mobilizing for work in SA1-C, when water conditions were more favorable than during the original evaluation.

Pre-existing Condition:

- The outlet appears to be in fair condition. The top of the end of the pipe has a small spalled area.
- The headwall is overgrown with vegetation.

Protective Measures:

- If an isolation cofferdam is required, it should be placed with a minimum 4 feet clearance to the outlet and headwall.



View of the outlet from the north bank (dewatering equipment behind)



Designation: SA1-C-S13

Location: SA1-C-S13 is located along the east bank of Portage Creek at the guy for structure SA1-C-S06. It is located at the normal water line.

Description: SA1-C-S13 is a 24-inch concrete outlet pipe. It was identified by EQM while mobilizing for work in SA1-C, when water conditions were more favorable than during the original evaluation.

Pre-existing Condition:

- The outlet appears to be in fair condition. No undermining is evident.
- The outlet is becoming overgrown with vegetation.

Protective Measures:

- Due to its size and proximity, an isolation cofferdam is likely required to bypass wet weather flows. Maintain a minimum 3' clearance from the outlet with the cofferdam structure.



View of the outlet from the west bank (dewatering/bypass equipment behind)



